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An Address

ON

THE EVOLUTION OF THE SURGERY OF HEAD INJURIES.

Delivered before the Medical Society of London on Dec. 9th, 1929,

BY WILFRED TROTTER, M.S. LOND., LL.D. EDIN., F.R.C.S. ENG.,

HON. SURGEON TO H.M. THE KING; SURGEON TO UNIVERSITY COLLEGE HOSPITAL.

IN any general discussion of head injuries it is important to keep clearly in view how very old this branch of surgery is. Even if we take no account of the fact that operative opening of the skull has certainly been practised for many thousands of years, it is unquestionable that there is no other older department of the art. This seniority has the important consequence that the surgery of head injuries as we receive it to-day comes down to us not only grounded in an immeasurably large experience, but encrusted with tradition embodying doctrines of which some are still useful and living while many have outlived their vitality and yet are unable to die.

We are accustomed to think of surgery as an essentially progressive art and yet there is perhaps none in which conservatism is more deeply ingrained. This inherent conservatism is well shown by the way in which ideas that once had a real or supposed validity survive long after the advance of knowledge has made them actually obsolete. It is scarcely necessary to illustrate this tendency, but we may cite a single example from the very junior branch of abdominal surgery. The doctrine of the excessive susceptibility of the peritoneum to infections was of vital importance in its time but was, of course, very soon superseded and disproved under the antiseptic method. Nevertheless it lived on, and ingenious and difficult extraperitoneal methods of ligaturing the iliac vessels were taught and practised for long years after the transperitoneal route had become as safe as it was easy and obvious. If it was possible for so rapidly arising a subject as abdominal surgery to be encumbered by superseded ideas, it is natural to find that the old and slowly developed surgery of head injuries shows the same tendency in a much more marked degree. In fact, it may be said without exaggeration that one of the chief needs of this branch to-day is a resolute overhauling of its inheritance of ideas. The difficulties of its work are in the best circumstances very great; we should at least not add needless ones by trying to use conceptions that have lost their validity or of which the form is unnecessarily obscure or complex.

If we examine our subject with these considerations in mind we shall find that a roughly historical survey gives us a convenient method of bringing the immense amount of material into a form in which at least its outstanding features can be summarily dealt with. Our knowledge of head injuries has developed in three stages which though, of course, not sharply separated from another, are distinct enough to be usefully recognised. There was first a long period of slow progress unmarked by any very striking discoveries and extending up to, but not far into, the last third of the nineteenth century. This we may call the early period; it passed into the middle period, which comprised a space of some 30 years or so from the 'seventies of the last century and was chiefly characterised by the entry of the experimental physiologist into the subject and the consequent rapid advances in fundamental principles. Finally, the last 20 or 30 years may be regarded as a third period, the essential feature of which has been the harmonisation of experimental and clinical knowledge and the resulting tendency to simplification.

THE EARLY PERIOD: FRACTURE OF THE SKULL.

In the early days the sources of information were almost exclusively clinical and anatomical and what attempts were made to evolve a theory of the subject were so much influenced by speculative and a priori considerations as to be of little permanent value. Nevertheless a body of clinical principles was slowly built up which had a profound influence on the later development of the subject. I can attempt no historical account of the work done or of the men who did it in this phase, but it is of interest to recall a name or two at random of those who have left their mark, such as those of the Monros and of Percival Pott. It is the characteristic of the period that the subject was completely dominated by fractures of the skull. Fracture of the skull came to be looked upon as the essential event in head injury and cerebral manifestations as mere complications of fracture. This conception, no doubt useful and necessary in a primitive state of knowledge, persisted long after it had ceased to be useful and become misleading. It survives to-day, though no doubt in diminishing strength among medical men, but in the lay and especially the legal mind it persists with indestructible vitality. To get rid of it and to learn to estimate with accuracy the significance of fracture in head injuries is still a need of the surgery of the subject.

The Significance of Fracture in Head Injury.

We may therefore attempt in the briefest way to lay down what principles present-day knowledge seems to justify.

The skull, though its most obvious characteristic is its rigidity, is also flexible and elastic to a considerable extent. When, therefore, adequate force is applied to it, it yields correspondingly locally or generally according to the way in which the force is applied. It is this distortion that is responsible for intracranial injury. If the distortion is not large enough to pass the limit of elasticity of the skull the latter recovers its form when the distorting force is withdrawn and there is no fracture, though the brain may have already received serious damage. If the distortion goes beyond the limit of elasticity of the bone a fracture occurs, and occurs, of course, at the places where the distortion has been most marked. Thus when the external force is limited to a small area a local distortion alone is produced and if a fracture occurs the fracture will be local, and as we say, stellate, depressed, or punctured. When the external force is applied to a large area, as in falls on the head, the distortion of the skull is general, and if a fracture occurs it is a widespread fissured one, well named a bursting fracture. Such spreading fissures necessarily often involve the base of the skull, and then we have the famous "fracture of the base." In all the inherited vocabulary of head injuries there is perhaps no more unfortunate legacy than this term. Its capacity to convey a misleading impression of the lesion it describes is perhaps the explanation of its invincible vitality.

The *presence of a fracture*, then, makes it probable, though not certain, that considerable distortion of the skull has occurred; it therefore gives us some rough measure of the violence to which the brain has been exposed. The *absence of a fracture* is, however, no evidence that the skull has not been considerably distorted and the brain seriously damaged. When these facts are properly grasped it becomes clear that fracture no longer deserves the primary importance in head injuries that it used to possess and still to some extent retains.

Before we leave this early period it is useful to note that from it comes down to us some part of the technical vocabulary used in connexion with head injuries. The most notable of these time-honoured expressions is the term "concussion of the brain." There could be no better illustration of the disadvantages of using in a progressive subject explanatory

rather than merely descriptive names, for by doing so one is apt, as it were, to embalm a fallacious theory and give it an appearance of life most misleading to the inexpert and the unwary. The term concussion perpetuates the view that the familiar instantaneous traumatic paralysis that goes by that name is due to the brain having been shaken about inside the skull and having sustained some mysterious though happily transient detriment thereby. Judging by the evidence now available and with the proper reservation as to the provisional nature of all scientific statements, it may be asserted categorically that the doctrine conveyed by the word concussion is not correct, and that the state in question is due to the momentary and general anæmia of the brain that accompanies a general distortion of the skull.

THE MIDDLE PERIOD: COMPRESSION OF THE BRAIN.

The next phase in the evolution of the surgery of head injuries brought to its problems the help of the experimental physiologist and was to transform the subject from a largely empirical art into something approaching an applied science. In the latter part of the last century was begun by experimental methods the attack upon the fundamental problems of intracranial physiology with which we associate such names as those of Horsley, of Leonard Hill, of Kocher, and of Cushing. Such work gave us the essential facts about the peculiarities of the cerebral circulation and especially the importance of the venous side, it showed that circulatory disturbance is the chief mechanism by which cerebral symptoms are produced, and it taught us what symptoms are produced and how they are produced by a progressive lesion compressing the brain. All these are fundamental principles and of the most direct practical importance, and yet it must be admitted that they did not result in as much progress on the clinical side as they seemed to promise, or in the general elucidation and simplification of the subject for the student that they really rendered possible.

The comparative failure in the fertilising power of the new knowledge was perhaps in part due to two causes. In the first place the exposition of the new doctrines was apt to seem to the clinician abstruse and remote from practical reality—a difficulty that will be understood by those who have read Kocher's classical monograph. And in the second the subject was so much dominated by the theory of the localised compressing lesion that the student was apt to get the impression that the localised hæmorrhage that lends itself to successful operative treatment was the usual form of head injury with which he would be called upon to deal. Such cases of local hæmorrhage without other serious injury do, of course, occur, and thanks to the experimental school our understanding of them is very full and we can usually recognise and deal with them with brilliant results. But they are rare and form but a very very small proportion of the cases of head injury we meet with in practice.

We see, then, that the surgery of head injuries has inherited from what we have called its middle period, in addition to an invaluable treasure of the principles of cerebral physiology and pathology, a fallacious clinical impression that head injuries are largely a matter for urgent operations which can and should be undertaken in a considerable proportion of cases with reasonable expectations of success. It is the melancholy duty of anyone making a reasoned survey of the subject to discourage this still widely prevalent view.

THE MODERN PERIOD: CONTUSION OF THE BRAIN.

In order to give perspective to this very much condensed survey some notice of the more characteristic features of a present-day view of the subject is necessary. In the interests of simplification this purpose may perhaps be effected by commenting briefly on some three themes each of which may fairly be regarded as typical of the modern surgery of head injuries. These three themes are (1) the simplification of the theory of the subject and its closer relation to clinical actualities; (2) the recognition that the typical cerebral lesion of a head injury is in the nature of a contusion, local or widespread, superficial or substantial or both; (3) the emergence into clinical recognition of the minor and the unresolved contusion as definite entities capable of exact diagnosis and treatment.

The Simplification of Theory.

Expositions of theory that have come down to us from the experimental school contain undoubtedly the principles that are necessary to a practical grasp of traumatic cerebral lesions. Yet there can be few of us but must have been aware, after reading these acknowledged classics, of an uneasy sense that the confused and multitudinous events of our clinical experience have still refused to take on order and significance. Or again, how often have we not felt by the bedside the difficulty of reconciling the supposed precepts of our masters with the versatility of nature in producing symptoms that had no right to be there or in withholding symptoms that we had every claim to expect.

Some of these troubles were doubtless due to the mechanisms of cerebral lesions having been regarded too much as in a province apart and completely sui generis. It is true that the functional relations of the brain and skull are, strictly speaking, unique in the body. Looked at more broadly, however, the two make together merely an extreme case of the encapsuled organ. Viewed as an organ with a capsule completely rigid (to physiological forces of course) the brain is no longer the seat of circulatory mysteries of which the very exposition must be obscure. In an encapsuled organ of the ordinary type such as the kidney the continuous flow of blood is kept up by the capsule being extensible and elastic and permitting an expansion of the whole organ at each arterial pulsation. The rigidity of the skull makes some other mechanism necessary there; this is provided by the presence of a considerable low tension region between brain and skull (broadly speaking the subarachnoid space and the venous channels) which permits the brain to expand with each arterial pulse. This low tension space is just adequate to allow the full normal pulsations of the brain; the tension within it is that of the venous pressure which it constantly follows. Crude as this exposition has been designedly made it gives us an easy explanation of two outstanding anomalies—the normal presence of arterial pulsation in the intracranial veins and the singular extent to which the adequacy of the cerebral circulation is at the mercy of its venous side. It is this sensitiveness to any interference with the venous return which makes a mere bruise of the brain a serious lesion both because of its power of causing symptoms and because of its extreme slowness in resolution. A more striking and less familiar way of stating the same physiological facts is to say that the brain is the only organ in the body which, after injury, must return to exactly its normal size before it can function normally.

While the rigidity of the cerebral capsule is truly unique there is one interesting case of an organ—the testis—which shows a distant approximation to it. Here we find two of the characteristics otherwise limited to the brain—the risk of extreme disorganisation in sequence to a simple bruise and the liability to hernia formation when the organ is swollen and the capsule perforated.

Contusion the Typical Traumatic Lesion of the Brain.

In giving to each of the periods I have called attention to a somewhat arbitrary title, I have added as a sub-title the lesion with which in each particular phase observers have been especially concerned. Present-day views of head injuries leave no doubt that in dealing with them contusion of the brain should occupy this position.

The importance of distortion of the skull in the causation of brain injury has made it clear that in addition to the long recognised direct and polar (or

contrecoup) bruising to which the brain is liable under violence, the whole organ is subject to stresses and deformations which must expose its whole surface and substance to damage. After any injury at all severe it is probable that widespread bruising is always present. Such bruising, though not in itself a seriously destructive lesion, gains very rapidly in the gravity of its effects according to the extent to which the parts of the brain in the posterior fossa of the skull are involved. It is contusion here which is perhaps the most common cause of death and the most common cause of ultimate failure in apparently successful operations for hæmorrhage. In every case of severe injury all the clinical manifestations are, as it were, sketched on a background of contusion phenomena of all grades of definition. While contusion is so largely responsible for the gravity of head injuries, it has in comparison with gross hæmorrhage one very favourable character. This is that it can in its very nature scarcely give rise to pressures beyond the order of the venous pressure. It cannot, therefore, produce gross capillary anæmia and the accompanying paralytic states.

Thus contusion rarely calls for urgent operations, and in so far as it is amenable to treatment at all can and should always, at any rate in the early phases, be dealt with by milder measures. The range of severity of symptoms to which contusion can give rise is very wide, and we have now at our command a wide range of remedies none of which we can afford to ignore. Familiar as these now are the list of them cannot be too often repeated, and I give it with the remedies arranged roughly in the order of increasing severity of symptoms to which they are applicable—*rest; posture; hypertonic derivation*—(*oral, rectal,* or *intravenous*); *lumbar puncture; decompressive operation.* None of these measures can we afford to neglect, and each single one of them is at times capable of giving brilliant results.

The Clinical Recognition of Unresolved Contusion.

During the late war there developed a strong and healthy tendency to the general recognition of the fact that many conditions to which a vague organic pathology had long been assigned were actually true psychoneuroses. It is interesting to note that during the same period in the surgery of head injuries a process in exactly the opposite direction was taking place. A large group of clinical phenomena that had previously been assigned to the uninviting chaos of "traumatic neurasthenia" was found to be due to definite organic brain injury in the nature of minor and unresolved contusions of the brain substance.

Not less interesting from the point of view of the theory of knowledge was the fact that as soon as the true pathology of these states was known, their symptoms, which had been regarded as essentially elusive and indefinite, were found to be well defined, capable of exact description, and forming a characteristic clinical picture; here I need remind you only of its three characteristic elements—headache, giddiness, and minor mental changes. It is a common, indeed a very common, result of head injury of any grade of severity. Its development can often be prevented or greatly modified by precautionary treatment, and in its developed state in typical cases diagnosis is exact and treatment efficacious. The unresolved contusion shows itself as an indefinitely persisting but variable elevation of the intracranial pressure. As such its symptoms have that close dependence upon the state of the venous pressure that the studies of the experimental school had proved must be present in such circumstances. The elucidation of this troublesome clinical problem is thus perhaps the latest gift we owe to the distinguished band of experimental investigators whose work through so many years continues to fertilise this difficult and stubborn field. The surgery of head injuries can never be easy or popular, but in its foundation of scientific theory it has a treasure which may well be the envy of every other branch of our art.

LACTIC ACID AND CARCINOMA OF THE STOMACH.

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IT has been usual to be influenced towards a diagnosis of carcinoma of the stomach by three findings in the gastric contents—namely, achlorhydria, foulness with the presence of blood, and the presence of lactic acid. In this paper we do not propose to enter into an historical review, but merely to recount the results of gastric analyses in both malignant and non-malignant cases with special reference to the presence of lactic acid. In a previous publication[1] we have shown that the qualitative tests for lactic acid are unreliable. The problem was attacked from a quantitative point of view, and a method for the detection of lactic acid and its estimation in small quantities was described. We were able to show that 46 per cent. of the resting juices of a series of non-malignant cases contained lactic acid, while the later specimens of the fractional test-meals of the same series showed 36 per cent. to contain this substance. All the cases of carcinoma of the stomach investigated in this series were found to contain lactic acid. These findings threw considerable doubt on the theory that lactic acid is produced specifically through the presence of the carcinoma in the stomach. In one case only was it found possible to isolate the actual lactic acid present as a zinc salt, and the chemical examination of this proved it to be of the inactive variety. This pointed very strongly to a fermentative origin of the lactic acid, and argued equally strongly against its being produced by the metabolism of the cells of either the gastric mucosa or the carcinoma; for, if this were so, we should expect to find lævorotatory acid—namely, sarcolactic acid. It was pointed out that this was an isolated observation, and that work was in progress on other cases of carcinoma in order to verify this fact.

The objects of the present communication are as follows: (*a*) to determine the type of lactic acid produced in a series of cases of carcinoma, and thereby to trace its origin; and (*b*) to confirm or refute the statement that lactic acid can be produced very rapidly in the stomach. This is important because rapid production would appear to argue against its origin by fermentation.

Method.

All the patients were examined by the fractional method of gastric analysis. Two charcoal biscuits were given at 10 P.M. on the night before examination. After withdrawal of the resting juice, the stomach was washed out by the injection of water down the tube, followed by aspiration. Lactic acid was estimated by the method already described,[1] and the zinc salt was isolated according to the technique of Warburg.[2] The zinc salt was examined for its rotatory power, its water of crystallisation, and its ash content (ZnO).

Results.

(*a*) *Type of Lactic Acid.*—The patients investigated were seven in number, and included five cases of proven carcinoma of the stomach and two cases in which this condition was definitely excluded. The

[1] Dodds, E. C., and Robertson, J. D.: Quart. Jour. Med. January, 1930.

[2] Warburg, O.: Uber den Stoffwechsel der Tumoren, Berlin, 1926.

results are given in Table I., where it will be found that the lactic acid in every case was of the inactive variety, which points very strongly to a fermentative origin.

TABLE I.—*Showing Properties of Lactic Acid Isolated from Gastric Juice.*

Case No.	Rotation.	Water crystallisation.	ZnO %.
1	0	18·2	35·7
2	0	18·2	33·4
3	0	18·9	33·2
4	0	18·1	33·6
5	0	18·1	33·7
6	0	—	—
7	0	18·1	33·4
Lævo Zn. lactate.	$[\alpha]_D^{20} -6·8$	12·9	33·4
Dl. Zn. lactate.	0	18·2	33·4

(*b*) *Obstruction and Lactic Acid.*—Table II. summarises 12 cases of gastric carcinoma, showing the lactic acid in the resting juice. All cases had achlorhydria. It also states whether the patient had obstruction or not, the diagnosis of obstruction being based on either the radiological findings or the fractional test-meal. It will be seen that the cases with obstruction had a very much greater quantity of lactic acid than those without. Where, however, there was no stenosis, the amount of lactic acid was often less than that found in some of the non-malignant cases reported in this and in our previous paper. It is felt that this is still further evidence in favour of the fermentative theory for the origin of lactic acid.

Rapidity of Production of Lactic Acid.

The foregoing results seem to establish almost beyond doubt that lactic acid in the stomach is produced by fermentation. Only one argument against that theory remains to be overcome—namely, the statement of certain workers that lactic acid may be produced very rapidly in the stomach. It is declared by some that if the stomach of a patient with carcinoma is washed out, lactic acid will appear in appreciable quantities within half an hour of administering the test-meal. If this were true, it would throw a good deal of doubt on the fermentative theory; and it will be seen that our earlier cases appear to support the statement. Thus in the cases illustrated in Figs. 2, 3, and 4 appreciable quantities of lactic acid are produced towards the end of the test-meal, despite the fact that the stomach was washed out with water immediately after collecting the resting juice. It will be noticed, however, that the much-referred-to "disparity" of the later specimens is nothing like so marked as in cases published by other workers. We believe this is due to careful washing of the stomach, and we formed the idea that the greater the care taken in washing out the stomach, the less would be the disparity in the later specimens. A careful inspection of the stomach removed from one of our patients in the post-mortem room indicated the extreme difficulty of washing out such a stomach by the ordinary method. It contained a large growth which formed recesses and pockets which would be inaccessible to the ordinary washing out process. It was easy to see that during the later stages of the meal these pockets and recesses would discharge their contents into the main pouch of the stomach, with the result that lactic acid would appear with considerable rapidity, and thus lend support to the argument that it was secreted.

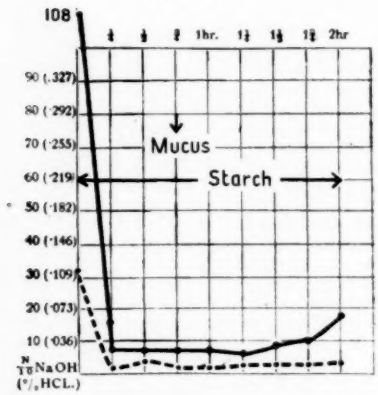
TABLE II.

Case No.	Age.	L.A.*	Obstruction.	Case No.	Age.	L.A.*	Obstruction.
1	53	0·111	Present	9	53	0·550	Present
2	62	0·640	,,	10	47	0·012	Absent
3	57	0·825	,,	11	49	0·005	,,
4	62	0·645	,,	12	37	0·020	,,
7	57	0·950	,,	13	60	0·051	,,
8	41	0·010	Absent	14	57	0·009	,,

* L.A. = Estimation of lactic acid in resting juice after 12 hours fast in g. /100 c.cm.

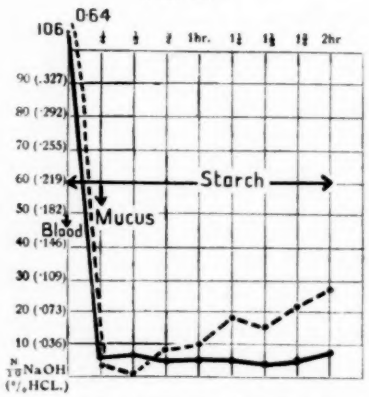
It was decided to investigate the next patient by a special method with a view to washing the stomach as clean as possible. By the ordinary technique of injecting water down a tube and aspirating it, it was found impossible to reach a point at which the washings were absolutely free from starch and lactic acid, therefore it was obvious that this method had to be improved. A series of experiments showed that very efficient washing could be obtained by getting the patient to swallow two tubes, down one of which an assistant injected warm water, whilst the operator aspirated continuously at the other tube. By repeatedly altering the position of the tubes—by pulling them up and asking the patient to swallow them again—it was found possible to wash out the stomach very thoroughly indeed, and after continuing

FIG. 1.



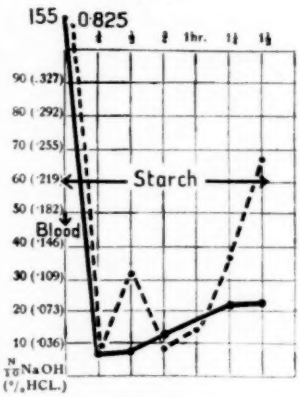
CASE 1.—Carcinoma ventriculi. Resting juice: volume 370 c.cm., odour foul, charcoal present, blood present. Residue: 370 c.cm. at end of two hours.
N.B.—In this and subsequent figures the continuous lines represent total acidity, whilst the dotted lines (figures in decimals) represent lactic acid.

FIG. 2.



CASE 2.—Carcinoma ventriculi. Resting juice: volume 650 c.cm., odour butyric, charcoal present, blood present. Residue: 250 c.cm. at end of two hours.

FIG. 3.



CASE 3.—Carcinoma ventriculi. Resting juice: volume 650 c.cm., odour foul, charcoal present, blood present.

this vigorous treatment for 1–2 hours, and using from 6–7 litres of water, it was found that the washings were absolutely clear and gave no reaction for starch or lactic acid. This method was applied in the case illustrated in Fig. 1, and the chart shows that the resting juice contained a very large quantity of lactic acid with a very high total acidity. After collection of the resting juice the stomach was washed out by the technique described, and it will be seen that the later specimens of the fractional test-meal contained very little lactic acid. This disproves the statement that this substance is produced very rapidly, even after washing out the stomach. It remains, however, to corroborate that the high concentration of lactic acid in the resting juice is due to fermentation and is not produced through secretion. This problem was attacked by taking the same patient and washing her stomach out very carefully by the two-tube method at 7 o'clock one evening. This was done until the washings were absolutely clean as described. At nine o'clock the next morning a tube was passed and the resting juice was collected. The analysis of this specimen was as follows:—

Volume	70 c.cm.	Bile	Positive
Odour	Normal	Free HCl	Absent
Blood	Positive	Total acidity	6·5 c.cm. N/10*
Mucus	,,	Lactic acid	0·006 g.*

*per cent.

It will be seen that it is in every way unlike the resting juices of the cases of carcinoma of the stomach, for the volume is relatively small, there is no foulness, and although free hydrochloric acid is absent, the total acidity is only 6·5 c.cm. N/10 per cent., as against 108 c.cm. N/10 per cent. on the previous occasion, whilst the quantity of lactic acid is extremely small. We were able to confirm this observation in Case 7. His stomach was washed out by the same technique at 7 o'clock one evening, and the resting juice was collected at 9 o'clock the following morning. The following is the result of the analysis:—

Volume	20 c.cm.	Free HCl	Absent
Odour	Normal	Total acidity	7 c.cm. N/10*
Blood	Positive	Lactic acid	0·008 g.*
Mucus	,,		

*Per cent.

It is felt that these observations completely prove the claim that lactic acid in the stomach is produced by fermentation and not by secretion. It is, therefore, justifiable to consider the rapid appearance of lactic acid after washing out the stomach to be solely due to inefficient washing, with the result that lactic acid, &c., enters the main stomach from the various crevices and pouches formed around the growth.

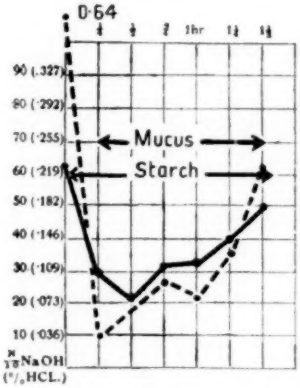
Summary and Conclusions.

1. Examination of a further series of cases has confirmed the opinion set forth in a previous communication, that lactic acid is found in non-malignant diseases of the stomach as well as in carcinoma.

2. The lactic acid in seven cases has been isolated in the form of a zinc salt, and by chemical analysis has been found to be of the inactive variety. This applies to non-malignant as well as malignant cases, and supports the fermentative theory for its origin.

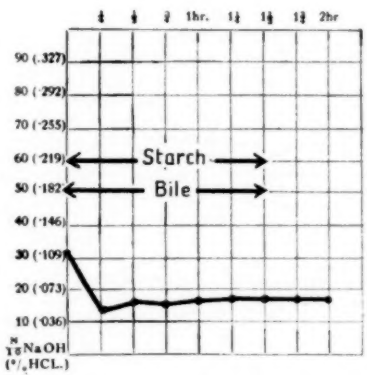
3. The only remaining difficulty in the way of the fermentative theory is the claim by many workers that lactic acid is secreted very rapidly even after washing out the stomach. Evidence is brought forward that it is very difficult to wash out the stomach of a patient with carcinoma properly, owing to the number of crevices and pockets around the growth. If, however, the technique described in the paper with two tubes be employed, it will be found that the amount of lactic acid in the latter specimens of the test-meal is negligible, and the total acidity is very low. These observations would indicate that the lactic acid is not secreted rapidly, but appears in the test-meal in appreciable quantities only if the washing has been insufficient and stagnant contents enter the main lumen from the various recesses and pockets around the growth.

FIG. 4.



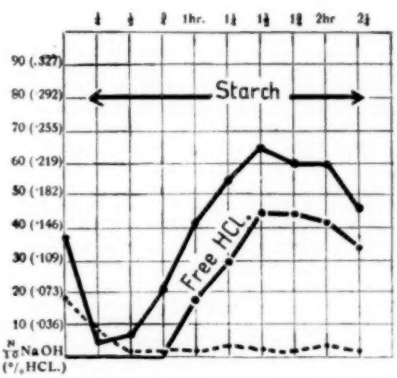
CASE 4.—Carcinoma ventriculi. Resting juice: volume 650 c.cm., odour foul, charcoal present, blood present.

FIG. 5.



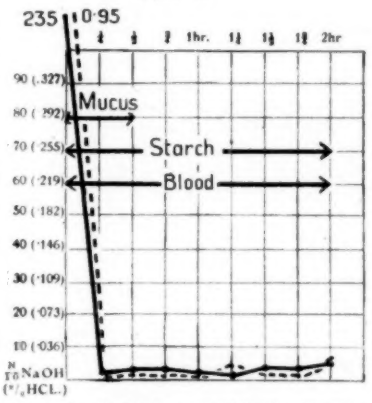
CASE 5.—Chronic appendicitis (laparotomy). No lesion of stomach. Resting juice: volume 74 c.cm., odour foul, charcoal present, blood absent, bile present. Residue: 220 c.cm. Resting juice and stomach washings: Lactic acid estimated at 0·076 g. per 100 c.cm., 140 c.cm. gave 0·11 g. zinc lactate. Water of crystallisation, 18·1 per cent.; ZnO, 33·7 per cent.

FIG. 6.



CASE 6.—Migraine (stomach normal on repeated radiography). Resting juice: volume 200 c.cm., odour normal, charcoal absent, blood absent, mucus present.

FIG. 7.



CASE 7.—Carcinoma ventriculi. Resting juice: volume 760 c.cm., odour foul, charcoal present, blood present, mucus present. Residue: 240 c.cm. at end of two hours.

4. If the stomach of a patient with carcinoma be washed out (by the technique described) on the night before the test-meal, it is found that the resting juice collected 12 hours later contains practically no lactic acid. This is evidence that neither the stomach mucosa nor the growth are capable of producing lactic acid by themselves even in 12 hours. It is interesting to note that there is no evidence of foulness in the resting juice of patients so treated.

5. If the lactic acid content of the resting juice be contrasted with the clinical and radiological evidence for obstruction, it is found that the lactic acid content is very much greater in cases with obstruction than in cases without.

6. It is felt that these observations prove that the lactic acid is produced through a fermentative action combined with pyloric obstruction, and is, therefore, of little or no diagnostic value for carcinoma of the stomach. In support of this it is found that the lactic acid content in cases of carcinoma with no obstruction is often less than that found in non-malignant diseases.

It is a pleasure to acknowledge the kindness of Dr. G. E. Beaumont and Dr. T. Izod Bennett, who gave us permission to investigate their patients. We have to thank Mr. E. J. Gallimore for assistance in the analysis of specimens, and in preparation and examination of the zinc salt. We also wish to express our gratitude to the Halley-Stewart Trust Fund, which provided the apparatus, and a considerable amount of the assistance, for this investigation.

THE HUMAN MACHINE.

ITS EFFICIENCY AND LIMITATIONS.*

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I AM interested in myself, my machine, because it is mine. Moreover, as a medical man I am occupied in assisting to maintain the efficiency of machines; to ascertain causes of a breakdown; to recommend such repairs as I think likely to restore efficiency completely or to the best of the potentialities of the material. In some respects the doctor is the mechanic at a garage, but with this difference, of course. The mechanic being a workman can repair machines made by workmen like himself; only Nature can repair the Nature-made machine.

A Comparison with the Internal Combustion Engine.

I propose to attempt some comparison of the human machine with the internal combustion engine, but with the full realisation that the analysis must not be pressed very far. As soon as one reaches purely vital phenomena comparisons must break down; and in the case of the human being, additional complexity is introduced by the highly organised nervous system with its necessary frailties, its likes and dislikes, its whims and fancies, its hopes and fears. Nevertheless, I think this attempt should deserve your sympathy partly because we are not in serious philosophic contemplation this evening, and partly because I regard it of value for people occasionally to consider their bodies from a mechanical aspect.

To this extent, at any rate, analogy holds good. Inefficiency in the motor-car is often the result of faulty construction; inefficiency in the human machine may similarly be fundamental. In both human and mechanical machinery a construction originally satisfactory may be damaged, more or less irreparably, by neglect or misuse. And, finally, both are under the influence of environment: variable road surfaces in the case of the motor-car; a multitude of conditions in the case of the human machine.

That these strictly analogous circumstances are not generally realised is the everyday experience of the doctor compelled to encounter many unreasonable complaints and expectations.

Recently a physicist has taken it upon himself to reproach the medical profession because of its inability to prevent heart disease or provide better aids to defective eyesight than spectacles or more efficient attempts to cure deafness. This physicist is an expert motorist, and he ought, therefore, to appreciate the difficulties of those who minister to human machinery, since he is confronted with similar propositions in his own sphere. What would he think of a complaint that an engine put together out of originally defective material which had undergone a severe injury to its lubricating apparatus and the design of which was more appropriate to a commercial than a racing chassis, was incapable of climbing a test hill on top gear, or of running for 200 miles at 40 miles an hour without an involuntary stop? Or of a request to perform some sort of operation upon a tyre which had been in continuous use for 15,000 miles over rough surfaces, and restore it to the condition in which it left the works?

To compare vital issues with non-living material is to some minds repugnant in any circumstances. To others the comparison is only too welcome. There is one type of mind which thinks statistically and believes that the wonders of the human machine can be best conveyed by some such statements as that the blood-vessels of the lung if stretched out in a line would extend half-way to the moon; or that the red corpuscles if laid out flat would form a carpet so many inches wide and so many miles long, a form of measurement which to me personally has no significance whatever. There is another type of statistics, a sort of contemptuous materialism, in which the components of the human body are estimated in the following homely fashion. An average man's body weighing 10 stone is composed of enough water to fill a 10-gallon barrel, enough fat for seven bars of soap, carbon enough for 9000 lead pencils, and phosphorus enough to make 2200 match-heads; magnesium enough for one dose of salts, iron enough to make one medium-sized nail, lime enough to whitewash a chicken-coop, and sulphur enough to rid one dog of fleas. The whole at post-bellum prices could be purchased for five shillings. And the same statistician might have completed his summary by pointing out that it was much the same whether the body in question was that of a village idiot or of an Einstein.

Human and Animal Achievement.

Fortunately for one who would be horrified at the idea of attempting to consider the almost unlimited capabilities of the human machine on the intellectual side, this aspect of the matter is unnecessary in the present consideration. But it is easier and not without interest to enumerate some of man's achievements on the physical side in which connexion he may logically be regarded as a machine. Now admittedly things of flesh and blood cannot compete with non-living machinery; man, too, comes off badly in comparison with many of the lower animals. The development of the large brain together with the assumption of the erect attitude put man at many mechanical disadvantages. The wonder is that in the circumstances his achievements are so noteworthy. Man, in his choice for comparisons, pays deference to the lower animals, not merely on the physical but on the mental, and even the moral, platform—indication of his protean qualities. And it must be claimed for him that, whereas his specialised functions have in some respects been severely detrimental to his physical possibilities, man is still capable of some remarkable performances. One remembers that, although the cheetah is credited with a speed of 60 miles per hour, a velocity equalled by the greyhound, and

* An address delivered to the Guild of Public Pharmacists on Jan. 22nd, 1930.

that a horse has achieved approximately 40 miles per hour, few animals can beat a crack sprinter at his fastest—travelling 11·42 yards per second—23·3 miles per hour.

At longer distances, man's capability becomes even more conspicuous. He has run 112 yards short of 12 miles in the hour; 100 miles in less than 14½ hours, and in a "go-as-you-please" six days' contest has covered 624 miles, a feat which no horse could achieve. One has also to record the remarkable record of 3422 miles in 573 hours during the race across America in 1928. It is difficult to obtain reliable statistics of jumping capacities of animals not specially trained, but 8 ft. 2 in. appears to be a horse's record high jump, so that man's 6 ft. 8¼ in. is highly commendable. The horse's long jumps recorded are often apocryphal, but man we know for certain has cleared 26 ft.

Feats of endurance of the human machine are a striking tribute to the quality of the material and the adequacy of the lubricating system. It has been recorded that the piano has been played continuously for 120 hours, and one hardly knows whether this is a more remarkable achievement than swinging Indian clubs for the same length of time. The human machine, unsuited as it is for an amphibian existence, has swum for over 27 hours during a successful Channel swim. And whilst a record for staying under water for no less than six and a half minutes has been doubtfully claimed, there can be no question that four and a half minutes has frequently been achieved.

All sorts of tests of endurance may be and have been devised in a fantastic search after records. In this connexion one may mention the records of fasting men, whether as a music hall event or as a protest against political or legal coercion. But it is profitless to speculate upon the extent to which a machine, whether human or otherwise, may deliberately be abused and injured.

Sex Differences.

One must at this stage be prepared to say a few words upon the differences between man and woman as a machine, a subject of immense complexity on the psychological side and therefore temptingly appropriate in its reduction to something approaching fundamentals when anatomy and physiology are considered. It is perhaps unfortunate that in this respect conclusions must inevitably be based upon inadequate evidence. Protagonists of violent exercise for women are over-ready to compare the capabilities of the best woman with the average man, very much to the latter's disadvantage. We cannot compare the average man with the average woman, because the average woman does not supply material for this physical consideration, but we can utilise for the present argument the best achievements of each.

A record-breaking young woman has, during the course of a 100 yards race, attained a maximum velocity of 19·4 miles per hour (man's highest speed 23·3 miles per hour). Incidentally, it is interesting to reflect that sex does not appear to affect the physical capabilities of quadrupeds for the speed of the female equals that of the male. Woman's record high jump is 5 ft. 3 in.; her best long jump is 18 ft. 8 in.—i.e., considerably inferior to man's best, but far above man's average. Feats of endurance for women are deprecated, somewhat illogically for there is no reason to suppose that woman is less adapted than man in this respect. On the contrary, she appears to be capable of enduring moderate physical hardship of long duration better than man. The exploits of women as channel swimmers have only to be recalled in this connexion; women mountain climbers have almost equalled men in their accomplishments, and I believe that a female Arctic expedition would be eminently successful. Young women's cross country clubs are now commonplace, though long distance running is, on the whole, discouraged. One girl has been credited with the ability to run over the Marathon course of 26¼ miles in 3 hrs. 40 mins. 50 secs., a feat which I am disposed to doubt, though I do not doubt the possibility.

The Fuel.

In comparing the human machine with an internal combustion engine, and seeking analogies for the various parts, one's progress is at first smooth for one's similes are logical. The motor-car utilises the vapour of petrol as a source of energy. Petrol is selected because it is a readily oxidisable fuel, and regarded as a foodstuff is, so to speak, predigested. The motorist knows that there are grades of spirit, some promising (often with truth) to yield more power than others. The fuel of the human machine, from whatever source derived, is ultimately an easily oxidisable substance, glycogen; and whereas the petrol engine has no palate and establishes as a primary demand only that its fuel shall be clean and free from sediment, the human machine is more discriminating; and even if the ultimate source of energy be the same, the materials from which it is derived may and must vary considerably. It is not always realised that different human machines require different varieties of fuel. For strict comparison with the petrol engine we should visualise man as an ideal machine only when he becomes an ethereal mortal living on nectar, when his alimentary canal would be reduced to the condition of the feed-pipe of the motor-car. It is easy to supply reasons why this conception of man will never be realised. The whole food question must be bluntly dismissed in a thesis dealing solely with human machinery. For, reduced to fundamentals, the food supplied as fuel to the human machine is that stored up in the petrol tank, having been elaborated from the variable raw materials presented to it for digestion. This specialised part of the machinery has, in a way, nothing to do with its ultimate efficiency. The essential is the preparation of the fuel and the raw material from which it is prepared varies with the individual. From this we understand the fallacy of dogmatism—one individual will utilise as an optimum, raw material which would be inadequate, and even harmful, to another. Men capable of achieving first-class athletic results upon what may charitably be called freak diets, are too prone to suppose that their experience is not merely individual. And so adaptable are the human laboratories that the diet question is really insignificant so long as ordinary sensible regulations based upon the past experiences of many generations are followed.

Even at the present day a battle is perpetually being waged on the question of the best diet for physical exertion, and many old traditional ideas become translated into the terminology of vitamins and other modern discoveries. If there is one generalisation which may be permitted it is to allow the appetite and tastes of the individual to follow their natural inclination, and to deprecate Procrustean measures of any kind whatever.

Its Utilisation.

And now in our consideration of the fuel problem in our comparison of man and motor we encounter an essential difference in the method of utilisation.

In the motor-car, petrol is fed from the tank to the carburetter, where it is prepared (by admixture with air) for oxidation, and then passes to the cylinders. This suggests the passage of food to the stomach where it is prepared for assimilation and passed to the active tissues. But whereas in a petrol engine oxidation precedes work, in a muscle work precedes oxidation. The muscle may be regarded as a storage battery working on energy previously stored. Contraction breaks down sugar into lactic acid, which, by subsequent oxidation, becomes carbon dioxide and reconverted sugar and glycogen. And whereas in violent exercise a certain amount of lactic acid remains in the muscles to be oxidised at rest, the provision of an adequate supply of circulating blood

with oxygen is indispensable through the arteries (the inlet valves) into the muscles (the cylinders), and out by the veins (the outlet or exhaust). Just as the bore and stroke of the cylinder determine to a great extent the power of the car, so the efficiency of the muscles makes the human machine a good or a bad athlete. But with living tissue there is quality as well as quantity. The muscles of a naturally gifted highly trained athlete possess special qualities—for example, better contractility and the capacity to tolerate lactic acid, qualities which are not easily described in terms of mere machinery.

For oxidation ignition must occur. In the human machine the magneto is the brain which, notwithstanding its complexity of working in relation to the whole mechanism, may for simplicity be regarded here as purely a means of ignition. From it impulses pass down the nerves (copper wires) to the terminations in the muscles (sparking plugs). The man who can run or row or perform any well-coördinated act is the man-machine with a perfectly timed magneto. And whilst such timing is to a large extent his natural heritage, training for athletics is an education of the brain to send out the proper impulses.

The blood (in addition to its other qualities) is the lubricating oil, and the heart is the pump. The radiator is obvious; the whole of the body is the human radiator exposed as it is to surrounding media, and keeping the engine cool by evaporation from the surface. With excessive heat production the radiator boils—that is to say, the human machine perspires.

The transmission, gears, and wheels are comprised in the tendons, joints, and bones. Legs are a sorry substitute for wheels in some respects, but they are admirably adapted for the large variety of purposes they are called upon to fill. Broadly speaking, the human machine has a fixed gear, one depending upon the relative proportions of the parts of the lower limb, and particularly on that of the heel to the front pillar of the foot. If we could alter the length of the heel at will we should possess a variable gear. We find that in the sprinter the front pillar is relatively long, so that the leverage gives great power to the calf. In the long distance runner the relatively long heel gives less leverage but a better sustained effort—a short stride with proportionately little exertion.

Admittedly all these analogies are very elementary; scope for amusement, perhaps, rather than instruction. Any attempt to delve deeper discovers the complicated laboratories of the human machine for which there is no parallel. It is a coördination of units, it is built like a machine, but it has the organisation of an army. Yet again I say there is some advantage in thinking mechanically, if only to appreciate the value of keeping the machine clean, of preventing unnecessary friction of the bearings, of avoiding overloading or overheating, and of attempting to select the type of machine for the work required.

Advantages and Drawbacks of the Living Machine.

The living machine must work at certain disadvantages. Given the proper rate, proper load and proper lubrication, one hour in the day is as good as another for the non-living machine. Man is a diurnal, not a nocturnal animal; and furthermore a motor, save by gross misuse, does not necessarily become tired; fatigue of living tissue is, of course, inevitable. In this respect let us return to seek some more elementary analogies. The human machine enjoys the advantage that it does not wear out in the fashion common to ordinary machinery. On the contrary, it is constantly renewed, and so far from depreciation, improves with use for a number of years, until the only really perishable part, the magneto, wears out. Even if the paint becomes scratched—blisters on the feet—the paint is gradually restored spontaneously, without trouble or expense, to its pristine excellence.

Yet again one is tempted to further, perhaps dangerous, analogies. It was amusing and interesting to witness during the "Veterans' Rally" on the Brighton-road the spectacle of a 30-year-old puffing and wheezing its way along, not a single part of it without a defect of some kind, but still proceeding under its own power. It passed by the roadside a magnificent £3000 modern representative, temporarily immobilised, in all its pride and perfection, by some such trifle as a loose electrical connexion, or a tiny piece of grit in the carburetter jet. So, I reflected, it is with the human machine. We see a body in the last stages of a mortal illness in which practically every organ is the seat of disease and more or less impaired function, but in which life continues with an intelligence completely unclouded. With this we contrast the man in rude health, suddenly smitten down by a clot in a vessel supplying a vital area, or some other trifle almost ludicrous in its terrible capacity for turning life into death. Some years ago a man was brought into this hospital dead. Examination and inquiry into antecedent circumstances revealed the following. In leaving a public-house he injured his hand in the swinging door. Instinctively he applied his mouth to the injured part and inhaled a small piece of skin which had been abraded straight into his larynx with the production of spasm of the vocal cords and death. The history of medicine is full of examples of the most trivial injuries being responsible for sudden heart failure. Unfortunately, analogy breaks down at this stage; the motor-car may be restarted; life, once arrested, is arrested for ever.

"A Fat Spark."

Apart from loss of power through physical causes identical with those which may affect the petrol engine, the human machine has the additional disadvantage that the magneto may, through purely emotional causes, fail spontaneously to work efficiently and provide a "fat spark." Such functional consequences, no matter upon what they must ultimately depend, to a great extent determine human efficiency. In motoring terms, a soiled magneto or missing plug; in medical language, brain fag or neurasthenia. Much may be said in admiration of the perfect timing mechanism which in a motor-car arranges the opening of the inlet valve and the closure at the precise moment when the compression stroke is completed with the remarkable rapidity necessary for great velocities. And yet what is such a mechanism compared with the human machine? When walking four miles an hour, only half a second elapses from the time the heel is raised until the limb has swung forward and the foot is again planted on the ground. Yet in that half second, 54 muscular engines have been started and stopped, speeded up, and slowed down a countless number of times. And this is the merest trifle compared with the performance of a crack high jumper. Think of the mechanism controlling the complexity comprised in such a series of directions as these. "The left foot is brought up level with the bar; the right leg is kicked out towards the right and is then cut in under the left leg, whilst the jumper should then give his hips a wriggle upwards, completing the movement by kicking the right heel up behind the body and swinging the left arm over and down." And the time during which the entire series of coördinated movements is completed is four-fifths of a second!

Selection for Special Purposes.

A feature of practical importance which frequently comes up for discussion is the ability to recognise types which are suitable for particular purposes, a criterion which would be of overwhelming importance in all branches of human activity. We know that many human machines are clearly unsuited for the vocation to which they have been committed through tradition, sentiment, caprice, necessity, and so on. But again it is necessary to limit oneself strictly to the physical side, and apply oneself first of all to the principle of the motor-car receiving its periodical overhaul, a principle which is reproduced in the occa-

sional recommendation that a medical examination at intervals is a precaution which may prevent premature breakdowns. The underlying idea is good enough, no doubt. The engineer oils and greases and cleans and so provides for absence of friction in any of the moving parts. He tightens all loose bolts and nuts, and replaces all defective parts by spares. Should there be a lack of power, he will locate the seat of the trouble, and remedy a defective magneto and its connexions, arrange a more suitable mixture for the engine, or loosen a binding brake. To a certain extent the doctor can offer analogies both as regards diagnosis and treatment, but his difficulties are increased by the complexity of diagnosis and the impossibility of replacing defective parts by spares. It is fortunate that Nature carries her own spares and automatically replaces worn-out parts until the mechanism itself wears out, when senility begins.

A binding brake may have its equivalent in the relative deficiency or excess of one of the ductless glands; though when lack of power sets in, the identification of the part responsible is complicated by the occurrence in human machinery of the functional disorders to which I have already referred, disorders which are unaccompanied by organic change and give rise, as we say, to no physical signs, but may be responsible for symptoms equal in magnitude to anything produced by serious disease. Perhaps in this connexion the only approach to mechanical analogy would be the introduction of a super magneto specialist.

It is conceivable that such a periodical examination might reveal to the trained eye some superficial manifestation of an apparently innocent character, in reality a very early appearance of a serious disease. But as regards internal disorders and serious constitutional disturbances, these do not necessarily advertise themselves externally nor by symptoms any more than grave internal trouble in the petrol engine which, however imminent, may be quite unsuspected until the bearing seizes or the shaft breaks.

I cannot help thinking that the man who wants to subject himself to regular examination is the equivalent of the fussy owner-driver, who wants to take excessive care of his car and is perpetually taking the engine down to discover the origin of some supposed abnormality, or even to reassure himself that all is well. And exaggerated caution must surely lead to morbid imaginative notions equivalent to keeping the car in the garage instead of on the road.

Super-Performance.

One witnesses many attempts to explain the capacity of the super-athlete. The possession of a special and sometimes peculiar proportion of the limbs or of a distinct musculature or even quality of muscle tissue is sometimes invoked. These are obvious explanations, and have a limited application. In our analogy with the petrol engine they would refer to the size of wheels and the gear ratios. As would be expected, a multitude of hypotheses are built up on dietetic considerations, and if a great athlete happens to have some queer prejudice in that respect, it is not surprising that he has a large following, and equally not surprising that the disappointments of his imitators are numerous.

The existence of a "wonderful heart" is sometimes proclaimed, always by an authority who has not the responsibility of showing in what respects the heart differs from that of thousands of other very ordinary athletes. The real explanation is simply that everything necessary in the construction of the machine is just right at the right time. And, after all, the difference which makes all the difference where super-performances are concerned is exceedingly small. Two-fifths of a second separates a great sprinter from the good sprinter, a difference of only 4 per cent. In intensive competition, 1/100th second is a determining factor; about four inches at the end of a race, and here one is in the region of only 0·1 p r cent.

It would be far different if one were confronted with a man who would on present standards be in the class not of superman but superhuman. The appearance, let us say, of one who could run not 5 per cent. but 30 per cent. faster than anyone in history, or of one who could cover in an hour not 12 miles but 15 miles, or who could jump not 6 feet 8 inches, but 8 feet. We should then be compelled to look for some really special feature, either a peculiarity of muscle substance or an entirely strange biochemistry. But until that phenomenon arrives there is no need to seek the mysterious or fantastic.

So far as investigations into the physiology of the subject lead us, A. V. Hill says that velocity is not a question of exerting greater propulsive power but of low viscosity—i.e., lessened internal friction—of muscle. Endurance he has explained as dependent upon oxygen-supply and the capacity to tolerate fatigue products. As Hill puts it, the oxygen inspired during effort is income, and upon income no athlete can live. The lactic acid accumulating in the muscles as the result of insufficient oxygen income is the security for the oxygen debt—i.e., the oxygen subsequently used for oxidation. And so long as the security remains adequate, by so much may the expenditure of oxygen exceed income.

From these considerations we see that the natural capacity for exertion depends upon a number of factors. The oxygen income must be high—i.e., the heart and circulation generally and lungs are of the highest efficiency. The oxygen requirement must be economical—i.e., not extravagant nor wasteful through purposeless movements. The security for incurring a large oxygen debt must be good, and this is a factor inherent in the muscular fibre itself, but capable of improvement by training. And all of this seems delightfully simple in the laboratory. It will explain capacity up to a certain point; it will not explain some extraordinary discrepancies. For what no considerations of machinery, of chemistry, or of physics can explain is the will power and what is bound up with it, the reserve which is beyond measurement.

It is impracticable to perform experiments upon men in circumstances of extreme stress; and what cannot be measured is the willingness to submit to complete exhaustion, willingness which must vary in the same individual on different occasions and be influenced by a large variety of factors so that on one occasion he is prepared to fill the unforgiving minute with 60 seconds worth of distance run and on another his form is surprisingly bad.

We may congratulate ourselves that the efficiency of human machinery is not an affair of measurements only, not merely the determination of a maximum oxygen-supply. For if it were, competition would be a very dull proceeding, a mere question of preliminary calculation and decision by arbitration; and life would lose not a little of the spirit of adventure.

HOSPITAL COÖRDINATION AT CHESTER.—A consultative committee composed of representatives of the city council, Chester Royal Infirmary, Chester Maternity Hospital, and the Chester Division of the British Medical Association has been formed to consider the best means of coördinating the health work, municipal and voluntary, of the city.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL.—It is proposed to extend this hospital at a cost of between £20,000 and £30,000. Adjoining land has been presented upon which a new block will be built to comprise a children's ward, complete medical and surgical units with an X ray wing. It is claimed that this wing will have better accommodation, in the way of treatment, examination, and dressing rooms than any other hospital in Manchester. There will be an increase of 20 beds or, if means permit of providing accommodation for paying patients, of 36 beds. The annual report shows that for the year ending June 30th, 1929, there was an excess of expenditure over income of £3347, which brings the total deficit to £7000.

TREATMENT OF LUPUS ERYTHEMATOSUS WITH BISMUTH.

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Lupus erythematosus was probably first recognised as a definite clinical entity by Rayer[1] in 1827. Biette,[2] in 1828, gave a very graphic description of the general appearance of the disease. Hebra, in 1845, suggested the name "seborrhœa congestiva," and six years later Cazenave,[3] in a classical contribution to medical literature, gave the disease its present name. Since that date various eminent medical men, including Vidal, Feulard, Capelle, Leloir, Besnier, Brocq, Darier, Unna, and Leredde have studied the condition, and it is interesting to note, in view of recent contributions to the literature concerning this disease, that the majority of the early writers published their work in Parisian journals.

Since 1851 the term "lupus erythematosus" has signified an inflammatory disease which causes atrophy of the skin without ulceration. There are three definite clinical types of the chronic form of this disease: (*a*) In type 1 the lesions are slightly erythematous, and their surface is covered with fine scales. (*b*) Type 2 exhibits but a slight degree of erythema. Scaling is not a marked characteristic, but the orifices of the sebaceous and sweat glands are blocked with plugs of horny cells. The areas affected are more indurated and less pliable than those of the first variety. (*c*) In type 3 the lesions are vividly erythematous, and there is but little scaling. The incidence of the first two types of the disease is approximately equal. The third type of the disease is rarely seen, and in my experience is more commonly found in females than in males.

The cause of lupus erythematosus is unknown, but it is commonly presumed that the condition is a localised manifestation of a chronic toxæmia, the source of the toxins being the usual foci in the teeth, tonsils, nasal sinuses, and intestines. Some authorities still consider that the disease is a tuberculide. No theory of importance as to why there should be at least three chronic forms of the disease has yet been advanced.

In 1911 Sequeira[4] wrote:—

> "Very few skin affections are more difficult to treat than lupus erythematosus, and a favourable prognosis can never be given, even if the disease has only attacked a small area. All that can be promised the patient is that eventually, perhaps after years, there may be a gradual remission of the symptoms and scarring of the affected areas."

It is still advisable to give a guarded prognosis, but the outlook has been improved by the addition of two new remedies to our armamentarium during the last ten years. The first is injection of gold salts,—e.g., sanocrysin and krysolgan. Good results are claimed for the injection of these, but they are extremely toxic, and cannot be used as routine measures. The second is by the injection of bismuth or its salts.

History of Bismuth Treatment.

In January, 1929, three Frenchmen, Nicolas, Lacassagne, and Rousset[5] published the first detailed paper on the Treatment of Lupus Erythematosus by Injections of Bismuth Salts. They pointed out that there had been several isolated observations on the treatment of this disease with bismuth by Hudelo and Rabut,[6] Lortat-Jacob and Legrain.[7] The earliest of these observations was not published in November, 1926, but the investigators were not very satisfied with their results, as Lortat-Jacob reports:—

> "The experience which I have of bismuth treatment in the cure of lupus erythematosus shows that the cure is sometimes, but only in exceptional instances, obtained. Sometimes there is a transitory amelioration, but the majority of cases remain indifferent to anti-syphilitic treatment."

On June 9th, 1927, Sëzary and Benoist[8] communicated two cases to the Société de Dermatologie, and shortly afterwards Nicolas and his colleagues commenced their investigations. In their paper published in January, 1929, they state:—

> "We estimate that the value of bismuth in this disease is greater than has yet been suggested. If all our patients have not attained a complete cure, the rapidity with which the signs have receded, the immediate effect on the subjective symptoms, and the state of the integument after a cure has been obtained, all militate in its favour."

Of 17 cases which they publish, all improved under treatment and ten were apparently cured. Hydroxide of bismuth was the preparation used in the majority of cases.

A Series of Twenty-four Cases.

During the last nine months I have treated 24 cases of chronic lupus erythematosus with bismuth injections. Metallic bismuth, bismuth oxychloride, and sodium-bismuth-thio-glycollate, have been used, the injections being given deep-subcutaneously or intramuscularly. Whenever possible the injections have been given once weekly or fortnightly, and in the majority of the cases after every 10 or 12 injections a period of some six weeks has been allowed to elapse before continuing bismuth treatment, so that there should be no risk of poisoning due to a cumulative effect. With regard to dosage, the average adult male or female can tolerate a dose of 0·3–0·4 g. of metallic bismuth or oxychloride of bismuth per injection, but 0·4 g. is the maximum which can be employed with safety. In the majority of the cases quoted below 0·4 g. of the metal or its salt has been given at each injection. I have found that metallic bismuth and bismuth oxychloride have approximately an equal therapeutic effect, whilst the thio-glycollate, which is a water-soluble bismuth salt, and therefore enables one to obtain a higher concentration of bismuth for a short period, has not, in my hands, given better results than the other preparations. I have tentatively tried giving bismuth oxycarbonate and bismuth salicylate in doses of grs. 5 to 10 thrice daily by the mouth, but without any apparent advantage to the patients. Inunction with colloidal bismuth preparations has not been tried, but local applications of "suspensol" (which is a colloidal preparation of metallic bismuth in an ointment basis) have not given satisfactory results. Two cases were given a 5 per cent. colloidal bismuth oxychloride ointment, and in one case (No. 12) there was a marked improvement.

Of a total of 24 cases treated since March, 1929, the following is a brief record of 14 of the most typical cases:—

Cases of Type 1.

Case 1.—Miss A., aged 28. First seen Feb. 18th, 1929. Four small areas of lupus erythematosus in scalp; three on forehead (two years' history). From May 14th to Nov. 30th a total of 5·6 g. metallic bismuth were given by injection. Considerable improvement occurred. Only two affected areas in scalp remain.

Case 2.—Miss G., aged 36. First seen May, 1928, when she stated that she had suffered from lupus erythematosus for 11 months. The nose was affected and there were symmetrical patches in front of the ears. From March 28th to Nov. 7th a total of 3·2 g. bismuth were given intramuscularly, the injections being given at irregular intervals. On Nov. 30th the patient was apparently cured.

Case 2.—Miss B. M., aged 18. Many small discoid areas of lupus erythematosus on scalp. A few on forehead. Lesions also on hands. From May 2nd to July 11th, 1929, a total of 0·8 g. metallic bismuth was given by injection. There was marked improvement, and from August 8th to Sept. 5th a total of 1 g. bismuth oxychloride was given. The lesions on the hands and forehead disappeared, but those on the scalp remained. From Sept. 17th to Oct. 17th 0·8 g. bismuth oxychloride was administered. On Oct. 30th one new area on the scalp was noticed. Two injections, each of 0·3 g. bismuth oxychloride, were given during November, but these had no apparent effect. Ung. bismuth oxychloride 5 per cent. was then prescribed. The patient has not returned for further treatment.

CASE 4.—Mrs. M., aged 38. Lupus erythematosus of nose. From August to November, 1929, a total of 4·8 g. bismuth oxychloride were given by injections. The lesions rapidly healed and there has been no recurrence.

CASE 5.—Miss B., aged 28. Nose affected and several areas on the cheeks. From August 2nd to Nov. 22nd a total of 2·7 g. bismuth oxychloride and 2·4 g. metallic bismuth were given. Considerable improvement has occurred, but none of the lesions have entirely disappeared.

Cases of Type 2.

CASE 6.—Mr. P., aged 39. First seen in July, 1929. Disease had been present for four years. On one occasion the lesions had been painted with acid nitrate of mercury, but for the preceding year nothing, except ung. acidi salicyl., had been used. The disease had steadily progressed, and in July, 1927, there was one large area on the left cheek and six small areas, each the size of a florin, affecting the left side of neck, nose, right cheek, and the left ear. From July 1st to August 8th a total of 2·6 g. metallic bismuth were administered. From August 21st to Sept. 13th 0·8 g. of thio-bismol was given, but there was no definite improvement. 1·4 g. metallic bismuth were administered during October, and the condition improved considerably. The patches are now healing at the periphery, but none of the original areas has completely disappeared.

CASE 7.—Mrs. O., aged 35. Oval patch of lupus erythematosus on nose, 2¼ in. in longest diameter. From July 10th to August 15th, a total of 0·6 g. metallic bismuth and 0·3 bismuth oxychloride was given. The lesions reacted rapidly to treatment, and by August 31st a cure had apparently been obtained.

CASE 8.—Miss H., aged 31. One discoid area of lupus erythematosus the size of a shilling on left cheek. One area the size of sixpence on forehead; 17 months' duration. From April 25th to Sept. 10th 1·8 g. metallic bismuth were given, and the patient was then discharged as cured.

CASE 9.—Mr. G., aged 38. Lupus erythematosus of two years' duration. Three discoid areas the size of a florin on left cheek. One area on neck below right ear. From July 16th to Nov. 30th 2·8 g. bismuth oxychloride were given. Lesions commenced to clear up rapidly.

CASE 10.—Mrs. F., aged 35. Lupus erythematosus. Three years' history. One discoid lesion on left cheek. From August 13th to August 26th 1 g. metallic bismuth and 0·2 g. thio-glycolate given. On August 17th carbon dioxide snow was applied. On Oct 15th she wrote "I am not cured."

CASE 11.—Miss G., aged 25. Very severe lupus erythematosus affecting the whole of both cheeks, the nose, and forehead, with a few discoid lesions in the scalp. From July, 1927, to April, 1929, she had received much local treatment with ultra-violet light. Salicin had been administered internally, and numerous external applications had been prescribed. From April 13th to Dec. 7th she received 4·8 g. bismuth and 1·5 g. bismuth oxychloride. Great improvement took place during October and November. Healthy skin is now visible in many areas on the cheek and forehead, and within the next six weeks she should be completely cured.

CASE 12.—Mr. H. L., aged 42. Two discoid lesions, the size of a florin, on each cheek, and one on left side of neck. From September to November, 1929, 4·8 g. bismuth were administered, and a great improvement was noticed.

Case of Type 3.

CASE 13.—Miss M., aged 34. Lupus erythematosus affecting eyelids and nose, extending downwards over the cheeks to a distance of one inch from the eyes. From July to October, 1929, a total of 4·8 g. metallic bismuth were given. No improvement. From November to December 1·6 g. oxychloride bismuth given. Some slight improvement then occurred, and the edges of the lesions began to clear up. No marked improvement was noticed until Dec. 4th. The patient was given 5 per cent. ung. bismuth oxychloride, and considerable improvement occurred during the ensuing 14 days.

CASE 14.—Miss C. M. J., aged 34. Lupus erythematosus of hands. Duration unknown. From April 10th to Dec. 7th a total of 1·4 g. metallic bismuth were given. Considerable improvement resulted.

With regard to local applications, in so far as was possible, the patients were kept on the same treatment as had been previously prescribed. The cases of types 1 and 3 usually used lotio calaminæ with 1 per cent. ichthyol, or Lassar's paste. The cases in group 2 usually applied 2 per cent. ung. acidi salicyl. Recently, local treatment with acid nitrate of mercury has been employed in a few cases, and recovery seems to be hastened by the adoption of this method in conjunction with bismuth therapy, although the amount of scarring is thereby increased.

Results.

To summarise these results. Of 14 cases of chronic lupus erythematosus—

5 cases, or approximately 36 per cent., were of type 1.
7 " " 50 " " 2.
1 case " 7 " was " 3.

In one case the hands alone were affected.

Two cases of type 1 and two cases of type 2 have been discharged as cured. Every case of the disease in groups 1 and 2 has improved to a greater or less extent, but the single case in group 3 only improved very slightly on bismuth injections. The time taken to establish a "cure," and the amount of bismuth which has to be administered, varies greatly with each individual. For example, Case 7 required only 0·6 g. bismuth and 0·3 g. bismuth oxychloride to obtain an apparent cure, whereas Case 12 was not cured after receiving 4·8 g. bismuth.

The one outstanding fact is that every case which has been treated with injections of bismuth, or bismuth salts, has improved, and has improved more rapidly than would have been anticipated had other remedies been employed. One other satisfactory finding has been that the lesions which respond to bismuth treatment heal with a minimum of scar formation, and in several cases, notably those belonging to type 2, healing has taken place without any residual scar being formed.

The mode of action of bismuth in lupus erythematosus is extremely hypothetical. The metal may act as a detoxicant, either in the tissues or when excreted into the large gut. It may perhaps act as a bactericide. If as a detoxicant it probably does not exert any influence when excreted into the bowel, for bismuth by the mouth has no marked therapeutic effect in these cases. More probably it acts by inhibiting the reaction of the tissues to the toxins (or bacteria) which cause the disease. Anwyl-Davies,[9] in a monograph on the use of bismuth in the treatment of syphilis, quotes the experiments of Kolle and Evers,[10] who injected a suspension of bismuth subcutaneously into the ears of rabbits, and four weeks later inoculated the animal with *Spirochæta pallida*:—

"No primary lesion or generalised syphilitic infection occurred until the bismuth deposit was removed two or three months later by amputation of the ears. When this was done typical chancres developed, and the usual train of syphilitic signs ensued without a fresh spirochætal inoculation. Then they showed that in rabbits which had been inoculated with *S. pallida*, but in which no chancre had developed owing to the presence of the depôt of bismuth, the popliteal lymph glands contained *S. pallida*. Thus, this organism had not been prevented by the bismuth from travelling into the tissues. They made an emulsion from the popliteal lymphatic glands of rabbits in which the syphilitic infection had not developed owing to the presence of bismuth deposit, and demonstrated that other animals could be infected by inoculating them with this emulsion from an apparently immune rabbit (which had been inoculated with the lymphatic gland emulsion from another apparently immune rabbit which had not reacted to inoculation owing to the bismuth deposit).

"Thus, the popliteal lymphatic glands of such apparently resistant rabbits are infectious, and it seems as though the bismuth in some way—possibly by some tissue reaction—merely *inhibits* the disease instead of having a direct curative action on the infection."

The tentative suggestion may therefore be made that any improvement occurring in a case of lupus erythematosus after the injection of bismuth or bismuth salts is due to the property which bismuth possesses in preventing the tissues from reacting normally to the toxins (or bacteria) which cause the symptoms of the disease. One would therefore expect that the persons who have been apparently cured will sooner or later exhibit a recurrence of the lesions. We may, however, claim that injection

of bismuth or bismuth salts offers a simple and satisfactory routine treatment of lupus erythematosus.

Summary.

(1) Fourteen cases treated by injection of bismuth or bismuth salts responded favourably to this treatment, but only four apparent cures are recorded (2) The total dosage of bismuth and the time taken to effect a cure was found to vary in each individual case. (3) Bismuth therapy can, in some cases, cause the disappearance of the lesions without the formation of a scar. (4) It is suggested that local application of acid nitrate of mercury, in conjunction with bismuth therapy, is the most satisfactory line of treatment. (5). It is suggested that the therapeutic action of bismuth is to inhibit the reaction of the lesions to the toxins (or bacteria) which cause the disease, and that therefore cases which have been apparently cured will probably relapse.

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THE ÆTIOLOGY OF YELLOW FEVER,

WITH SPECIAL REFERENCE TO THE PROBLEM OF INSECT-BORNE DISEASE.*

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AND

BIANCA HOHENADEL, M.D.

IT is not unlikely that the solution of the problems of yellow fever will affect the general attitude towards all those infectious diseases which to-day are called virus diseases. I should like to refer you to our recently published book on the germ of yellow fever for some details, and especially for statistical and experimental deductions. Since this book was written, however, we have learnt many new things, which I publish for the first time to-night.

Our experiments have so far been limited to about 550 rhesus monkeys, and for most of our experiments we used blood virus obtained by sterile puncture of the heart of the shaved and iodined animal, usually four to twenty-four hours after a rise in temperature. The mortality is practically 100 per cent. Only when the infecting blood is diluted about a million-fold do two out of ten animals survive. Strong, especially well-nourished and well-grown monkeys have a better chance of surviving the infection. The incubation period is about seven days, during which time virus is not usually present in the blood unless the transfer is somwehat massive. The rhesus responds to disease in much the same way as man, but the clinical phenomena are influenced by the fact that man, being a "psychic animal," refuses nourishment almost as soon as the disease breaks out, thus showing an early decrease in blood-sugar and cellular changes in the blood which in the monkey only appear much later. The breakdown of the liver decides the issue, and the disease, both in man and monkey, might be called a hepatodystropnia glycopriva acuta infectiosa. Lately we have inaugurated a large series of experiments on the green cercopithecus monkey from Africa, and there is no doubt that these can be infected in the laboratory with yellow fever from rhesus monkeys, but their illness is much milder. In cebus monkeys—even the rare fatal cases—the extreme glycoprivia and consequent necrobiosis of the liver cell was completely absent. There are, therefore, species which do not suffer hepatic destruction although they may harbour yellow fever virus in their blood for eight to ten days. Investigations on the guinea-pig have shown without any doubt that this animal is susceptible to yellow fever infection. Phloridzin hastens the infection, but is not indispensable. In many cases the incubation period is remarkably long. Not infrequently there is an initial fever during which the disease can be transmitted by the blood, but this is not yellow fever proper; the animals are happy and show an increase in blood-sugar. Later, after a period of normal temperature, real and often fatal yellow fever sets in and takes a characteristic course, but the anatomical changes are different from those in rhesus and man. Rhesus monkeys injected with liver emulsion from these guinea-pigs take fever much more quickly than if blood is used. We have been successful in maintaining yellow fever in guinea-pigs through six or seven passages and confirming it by reinjection of rhesus. There is a tendency for the strain to become adapted to the guinea-pig by successive transfers. Guinea-pigs infected with yellow fever without phloridzin never show necroses in the liver, and often show no change at all. The gastro-intestinal changes dominate the post-mortem picture. The gastric erosions and ulcers are typically neurogenic and secondary; the attacks of epigastric pain occurring during and sometimes long after yellow fever in human beings correspond to the picture of tabetic crises. In animals there may be gastric spasm or enormous distension; this, combined with distension of the lungs and abdomen and slowing of the heart beat, illustrates the vagotonic nature of the condition. Often a guinea-pig dies from shock when being shaved. Guinea-pigs are very susceptible to diphtheria, and it is remarkable that the Klebs-Löffler bacillus is very similar to our diphtheroid *Bacillus hepatodystrophicans*. Intestinal and gastric hæmorrhages may result from the destruction of liver cells, but it is quite evident that the actual formation of ulcers must be distinguished from tnis; they are an almost specific nervous consequence of a vagotonic irritation. By this means we recognise two distinct poisonous effects of the germ: a purely hepatodystrophic effect, which appears to be intimately connected in some way with sugar metabolism and a nervous effect. How far the two are connected is not known.

Cultural Investigations.

Our cultural investigations have led to the invention of nutritive media differing fundamentally from those usually employed in bacteriology. The principle of all the media is their physiological or quasi-physiological composition. A certain percentage of native albumin, to which the germs are accustomed, is required, and our media possess certain pH buffer conditions met with by the germ in the natural process of infection. The amount of Hottinger digestive broth is extremely small: about 6 per cent. of an eight-fold dilution, less than 1 per cent. of the original tryptic digestive product. Added to this is about 11 per cent. of a 1 in 1000 solution of Witte peptone. Highly virulent plasma put into this medium without tissue will preserve virulence for several days. The best results are obtained from heart culture made at the moment when titration indicates the highest amount of circulating virus

* Abstract of a paper read by Prof. Kuczynski before the Royal Society of Tropical Medicine and Hygiene on Jan. 16th, which will appear in full in the Proceedings of the Society.

Growth usually requires six days, and may even take sixteen; the germ then develops explosively from hour to hour in rapidly growing colonies. After this a delicate film develops downwards between the semi-solid medium and the glass tube. It is absolutely essential to have the virus free from any contaminations; a heart to be cultivated should not have been previously punctured. The basic type is a very small, irregularly shaped, very fine rod. These can become coccoid. Quite young cultures are often Gram-negative, but the reaction varies extraordinarily, and sometimes Gram-negative bacteria are found next to Gram-positive ones in the same culture. The bacillus resembles the diphtheria bacillus, especially in old and somewhat degenerated cultures. The form and size are considerably coarsened by liquid, and still more by albumin-free media. The strains cannot be considered in a proper sense anaerobic, but they live under varying conditions of nutrition. Tissue-free cultures use up oxygen and reduce methylene-blue; this effect may be due to growth or to disintegration products. The more work we do with this culture the more sure we become that it is derived from the virus and is a modification of the real agent, capable under favourable conditions of turning again into the virus.

We have done very many infection and immunisation experiments with subcultures of varying age. Some yield no result; others give positive results. Lately we have found that the incubation period may be considerably longer than we had formerly supposed. Directly after our return to Berlin we injected three rhesus with cultures which had last been subcultured in Rio, and two of which had been taken there from Berlin; all of them got yellow fever. A mixture of these three cultures produced yellow fever in guinea-pigs, one of which infected a monkey—the first time this has ever been done. While the individual reaction of the animal is very important, there is a virus reaction on the part of the parasite. Cultural injections often produce typical and transferable yellow fever only as a last attack, after the animal has already reacted; the illness in the previous attacks is often transferable, but not as yellow fever. It either has a very long incubation period or follows a relapsing course. When monkeys are infected by means of guinea-pig blood or organs, the adaptation of the non-cultivated virus to the different species brings about such a change in its relations to the new host that the conditions of both infection and immunity which are established in the animal resemble very closely those which exist in cultural infections.

We consider the culture of *B. hepatodystrophicans* to be a culture not of the virus but from the virus—i.e., a modification of the virus under the influence of our nutritive media. It cannot be obtained from healthy rhesus, and will only grow on our semi-solid media; it loses its infective power very quickly when the bacterial growth is lacking, though potential virulence can be preserved with care through more than 17 subcultures kept for 13 months. It is inconceivable that the virus could be carried over with the culture, as work on other viruses has shown their inability to survive under conditions such as ours. The suggestion, moreover, postulates a visible and an invisible culture present side by side, but this is contradicted by the fact that cultures which have themselves failed to infect have nevertheless produced virulent subcultures. The satisfactory immunising property of small quantities of virulent cultures could not have been due to the presence of dead virus, since much larger quantities of dead virus do not produce immunity. The a priori argument that a diphtheroid bacillus could never produce an infection is not supported by evidence, and our experiments have shown that the virus infection is not infrequently preceded by a cultural attack of germs which have not yet been adapted to their new host. The probability is that certain germs become smaller under certain conditions of environment, simultaneously undergoing an enormous multiplication. They have then great powers of penetrating the body. We believe that the extra-infective life brings about a considerable change in the virus germ; that its rate of increase slackens, and that its individual development increases according to the artificial conditions under which it is cultivated. There is no such difference of shape or size between the yellow fever virus and the cultivated germ as would justify their being regarded as separate entities. The corpuscles formerly described as virus bodies are about 0·1–0·2 μ in diameter; the smallest measured forms of our cultures in the tissue-free semi-solid physiological medium is 0·2 μ; the largest, grown in a liquid medium, being over 2 μ. The changes which take place in the smallest forms when they are taken out of the nutritive medium and allowed to grow larger can be easily followed, and culture on different media produces forms which can be traced back to the granulated forms which appear copiously in the blood smears at the beginning of the disease in man. When the blood is hæmolysed with saponin, large quantities of finely granulated formations of virus can be detected in the sediment. Moreover, monocytes from the blood of a mildly infected collaborator contained ingested virus, but in severe cases the viruses soon concentrated in the liver, as Hindle has shown.

Analogy with Typhus.

The fact of a *B. proteus* agglutination in typhus is well established, and it has been proved that rickettsia, biologically conditioned, are adaptive forms of the proteus group, convergent developments influenced by their infective life in the various hosts. It is probable that when insect-borne diseases appear in warm-blooded animals through the entrance of insect parasites "for the first time" under specially favourable conditions, the causal viruses have developed convergently from quite common widespread germs. There is, however, no proof of this.

The principle of culture in vitro is the discharge of an organism from a definite environment into a new one intentionally selected. The more completely the organism is adapted to its first environment, the more difficult it is to induce it to adapt to the new one, but the difficulty varies with the capacity of the germ for adaptation. The greatest difficulty arises when similarly formed infective relations are strung to one another in a chain without an intervening host, as occurs in the perpetual lice passages of the typhus virus as practised by Weigl. Work on the Rocky Mountain spotted fever germ shows that its appearance, formation, and manner of growth depend fundamentally upon the method of breeding.

The cultural problem is, therefore, to set the germ sufficiently free from its adaptation to natural conditions to enable it to be studied. The medium must, however, preserve the virulent properties of a germ, which are a definite physiological peculiarity. The classical media, which prevent the necessary physiological adaptation of the germ, hinder any study of its infective relations. To produce results, it requires a definite conditional adaptation, a cultural training to fit it to enter a state of infection, the first period of which is the period most adverse to it.

NORTH STAFFORDSHIRE INFIRMARY.—The report for the year ending on Oct. 31st, 1929, shows that the number of in-patients (5577) constitutes a record—ten years ago it was 3440. Their average cost has been reduced by 11*s.* 11½*d.* to £8 17*s.* 0½*d.*, and the average daily cost is down by 5½*d.* These reductions are the result of the investigations of special committees. The orthopædic attendances were 48,460; the artificial sunlight treatments increased from 4233 to 6054; there was a fall in the number of out-patients. On the year's working there was a loss of £1920, which, with the debt on the building fund, made a total deficiency of £56,254. Since the close of the financial year, however, most of the debt has been wiped out by the receipt of a legacy of £50,000 under the will of the late Miss Dora Twyford.

Clinical and Laboratory Notes.

A CASE OF TYPHOID FEVER

WITH PERSISTENT NEGATIVE WIDAL REACTION BUT POSITIVE "O" AGGLUTINATION.

BY A. D. GARDNER, D.M.OXF., F.R.C.S.ENG.,
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AND G. STENHOUSE, M.B., CH.B.MANCH.

THE notes of the following case, which has features of interest both for clinicians and pathologists, are published with the aim of calling attention to an important recent advance in laboratory methods, whereby cases of typhoid fever with persistent negative Widal reaction can be serologically diagnosed.

Clinical Description.

Miss A. B., aged 28, went to Italy for a holiday on August 14th, 1929. On Sept. 2nd, after bathing in a hot sun, she developed a headache and an acute attack of diarrhœa. Still suffering from headache, drowsiness, and increasing anorexia, she returned to England on Sept. 4th, and on the 13th had to take to her bed. She was first seen by one of us (G. S.) on the 14th. On the 19th, 17 days from the first sympton, a Widal reaction, done at the Royal Berkshire Hospital, Reading, was negative. She had never been inoculated against typhoid or paratyphoid fever. On the 25th a second Widal reaction, done at the Radcliffe Infirmary, Oxford, was negative. An examination of stools and urine was also negative for the typhoid group. A blood culture, however, yielded a bacillus, to be described below, which eventually proved to be *B. typhosus*.

The general clinical picture throughout the illness was of a severe typhoid fever, the first spots being detected on the abdomen in the third week. The spleen was never palpable, though splenic dullness was increased to percussion. During the fifth and sixth weeks there was a fairly severe hæmorrhage from the bowel. The sixth, seventh, and eighth weeks were complicated by a troublesome *B. coli* cystitis, and during the eighth and ninth weeks there was some periostitis of both femora. All complications were successfully overcome, and the patient made an uneventful convalescence. On Oct. 16th, 43 days after the first symptom, the serum still gave a negative Widal reaction to ordinary typhoid cultures. Two examinations of stools and urine for *B. typhosus* during convalescence were negative.

Bacteriological Notes.

The negative Widal test done on Sept. 25th at the Radcliffe Infirmary, Oxford (Dr. A. G. Gibson), with a standardised suspension of *B. typhosus*, was repeated and confirmed at the School of Pathology; and at the same time the serum was tested with two "O" suspensions of *B. typhosus*—viz., one made by treating with alcohol a smooth motile culture of *B. typhosus* 901; the other by adding 0·2 per cent. of formalin to a broth culture of the same strain in the non-motile "O" state. Granular agglutination occurred with both suspensions in four hours at 52° C., up to 1 in 125 (8 standard "O" units). This reaction was reported as positive though weak.

On the same day the Radcliffe Infirmary isolated from the patient's blood a non-motile non-lactose-fermenting bacillus of the typhoid coli group, which was not agglutinated by stock *B. typhosus* serum. Identification would therefore have been delayed had not an "O" agglutinating serum been available. With this, a full-titre "O" granular agglutination was obtained in a live saline suspension of the bacillus grown on an agar slope sown direct from the blood culture. The vast majority of the bacilli in the suspension were non-motile, but a very few swimmers were seen in the condensation water of the slope. Ordinary *B. typhosus* serum gave no flocculation (H) with this suspension, but slowly produced "O" granulation to a relatively low titre. Fermentation tests gave, on the following day, the picture of *B. typhosus*, and the bacilli in the various fluids were found to have acquired motility and agglutinability by ordinary typhoid (H) serum. The bacillus was clearly in the "O" state in the blood culture and first subculture, but rapidly changed to "H."

Further tests with the patient's serum gave granular agglutination (*a*) to 1 in 250 with a formolised broth suspension ("standard culture") of *B. enterit. Gärtner*; (*b*) to 1 in 500 with living saline suspensions of *B. typhosus* 901 H and O; (*c*) to 1 in 1000 with patient's own bacillus. Here the clumping was exceptionally fine; indeed hardly visible with the naked eye.

A repetition of the agglutination tests with a fresh sample of serum 20 days later gave: (*a*) again no H agglutination; (*b*) granular agglutination to 1 in 50 with formolised broth "O" suspension (6 standard "O" units); (*c*) granulation to 1 in 125 with living saline "H" 901; (*d*) feeble and unsatisfactory granulation to 1 in 125 with living saline "O" 901. It may be mentioned that the greater agglutinability of living suspensions is of doubtful value, since it raises the level of agglutination in normal serum as much as it increases the apparent titre of specific serum.

Commentary.

This case is far from standing alone. A considerable number of similar cases have been recorded by Burnet, Felix, and others.[1] We have heard very recently of another in this country, and a third came into the hands of one of us just before these notes were sent to press. [Negative H, positive O agglutination; non-motile "O" *B. typhosus* in blood.] In fact they are probably a good deal commoner than we have hitherto supposed. The value of the "O" test is, moreover, not confined to such cases as these or to cases in which O agglutination appears earlier than H; but it seems to be particularly great in the diagnosis of typhoid fever in inoculated persons with residual "H" agglutinins.

Since typhoid cases with negative "H" but positive "O" agglutination occur from time to time, clinicians should require, and pathologists perform, the Widal test with "O" suspensions in addition to the customary "H." Agglutinating serum of the "O" type should also be at hand for the identification of the so-called inagglutinable typhoid bacilli. The persistent low titre of the "O" agglutinins in this case is of interest.

BRONCHIECTASIS: FORME HÉMOPTOÏQUE SÈCHE.

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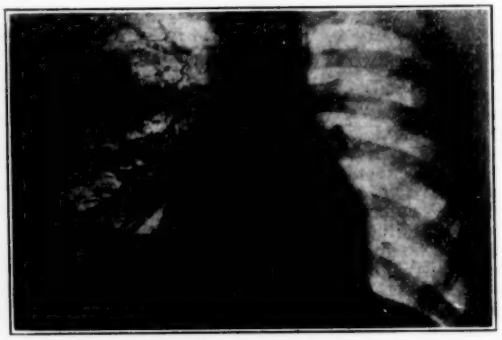
THIS form of bronchiectasis is characterised by periodic attacks of hæmoptysis but absence of symptoms between the attacks. Since the introduction of lipiodol, bronchiectasis may be diagnosed in cases where otherwise it would have been completely unsuspected. Such cases are by no means uncommon and the following may be taken as a typical example.



Bronchiectasis shown by an injection of lipiodol.

A young man, aged 23, had always had good health and led a normal athletic life. He had just passed through a theological college, and was considered to be quite fit, when

[1] See A System of Bacteriology, Medical Research Council, 1929, vol. iv.

suddenly in August he had a large hæmoptysis of over a pint. There were no physical signs and he felt perfectly well afterwards, but he was sent to Midhurst Sanatorium. Occasionally a few moist sounds were heard at the base of the right lung, but these were not always present, and X ray examination showed no definite disease in the lungs. There was no cough or sputum and he suffered from no dyspnœa or fatigue. The fingers were not clubbed. On injecting lipiodol, however, a considerable degree of bronchiectasis was shown, as can be seen in the accompanying skiagram which was taken by Dr. Stanley Melville.

In the absence of any symptoms no definite treatment was advocated, and the patient's health has so far remained good.

A NOTE ON THE USE OF AN ORGANIC SULPHUR COMPOUND IN COCCAL INFECTIONS.

By Dr. Elie Sassoon
(Alexandria).

The following notes are taken from a record of cases of pneumococcal, streptococcal, and staphylococcal infections, treated during eight years' service in the Sudan as medical officer, with a new sulphur organic compound to which I have given the name of "sulphoserum."

Preparation of the Serum.—To 20 c.cm. of sterile normal horse serum is added 0·4 c.cm. of 2 per cent. sol. calc. sulphurat., the mixture hermetically sealed in ampoules, and kept in an ice-chest. A reaction takes place within the ampoules, by which the calcium sulphide is decomposed into precipitated lime, with liberation of SH_2—part of which is dissolved in the serum.

Method of Administration.—Sulphoserum may be given in two different ways: (1) By local application. The region selected is cleansed, the skin is scarified, and a pad of cotton-wool soaked with the serum is applied. The SH_2 absorbed produces a tingling sensation radiating from the point of application; when it causes vertigo the application is stopped. A slight rise of temperature with discomfort and headache sometimes occurs a few hours later. The application may also be made to wounds. Some cases are more sensitive than others; the treatment in any case is adapted to the extent of the scarified surface, and the quantity and time of sulphoserum applied.

(2) The intravenous method is used when the patient does not react to local application. The initial dose is 0·25 c.cm. daily, increased if necessary. The injection should be given very slowly.

Sulphoserum was found to be of value in all pneumococcal, staphylococcal, and streptococcal infections. If given in the early stage of lobar pneumonia the pain ceases and fever drops to normal on the second or third day. Given early in acute inflammations, such as cellulitis or sympathetic ophthalmia, pain and redness subside, and the temperature falls. I have also used the serum to prevent secondary infection after surgical operations.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF GYNÆCOLOGY AND OBSTETRICS.

At a meeting of this Section on Jan. 17th, with Dr. Arthur Giles, the President, in the chair, Dame Louise McIlroy described

Three Cases of Imperforate Vagina Occurring in One Family.

The first patient was a girl, aged 20, who had never menstruated, but who, for some time, had been complaining of monthly pain, and of swelling of the abdomen. On examination she was found to have an abdominal swelling extending to two inches above the pelvis, non-fluctuant, and rounded. Per vaginam, a bulging membrane was seen in place of the vaginal orifice. On operation a large quantity of menstrual material was released; the patient made a good recovery and afterwards menstruated normally. Subsequently a sister, aged 16, was seen, giving almost the same history, but in this case occasional vomiting had occurred. The abdominal swelling reached the umbilicus, and a smaller rounded swelling, clearly the uterus, could be felt at its apex. Operation again gave excellent results, the amount of fluid being "extremely large." On inquiry, a third sister, aged 14, was presented for examination, who also showed this condition, but without bulging of the membrane, and apparently without abdominal swelling. Operation, however, released two pints of menstrual fluid, and resulted in subsequent normal periods. Sections of the membranes by Prof. Geoffrey Hadfield showed a connective tissue stroma with blood-vessels and smooth muscle-fibres, and an outer layer of squamous epithelium.

Prof. J. Preston Maxwell said he had met this condition not infrequently in China, and that imperforate vagina could be diagnosed from imperforate hymen by the presence of the hymen as a small fold on the surface of the bulging membrane. He thought the cases described by Dame Louise were more likely to be imperforate hymen.—Mr. L. C. Rivett said that the interest of these cases lay in the fact that they had all occurred in one family. There had been no previous evidence of a familial tendency in this condition.—The Chairman described the difficulty of dealing with cases in which the vagina was represented by an uncanalised column of cells. On one of his patients, a girl of 16, he had had to perform an abdominal operation to establish a patent vagina.

Dame Louise McIlroy, in replying, asked what her cases should properly be called—imperforate vagina or imperforate hymen?—The Chairman replied that, as there appeared to be no traces of hymen visible on the face of the membrane, these were probably cases of imperforate hymen.

Mr. J. H. Hannan gave the results of investigations on the detection of

Anterior Lobe Hormone of the Pituitary in the Urine.

In 1922, he said, it had been demonstrated that the anterior lobe of the pituitary produced precocious sexual maturity in immature female mice, denoted by canalisation of the vagina, the appearance of œstrus as judged by the vaginal smear, and the presence of corpora hæmorrhagica in the ovaries. In 1928 Zondek and Aschheim had used the presence of anterior lobe hormone in the urine of pregnant women as a test for pregnancy. Their technique had been to use five mice weighing 6 g. each in every case. 1·2–2·4 c.cm. of urine had been injected into these animals in six portions, over a period of 48 hours. At the end of 52 hours the animals were killed and examined for signs of œstrus, for hæmorrhagic points in the ovaries, and for the formation of corpora lutea atretica in the ovaries as seen microscopically. Positive results in only one of the five was taken as evidence of pregnancy in the patient. These workers claimed 98 per cent. of accurate positive, and 99 per cent. of accurate negative results. Owing to the difficulties of obtaining enough mice, and the high mortality among them from toxicity of urine, Mr. Hannan had employed young rats, aged 6–8 weeks, in his experiments, only one animal being used for each case; 3 c.cm. of urine was given, all in one injection, and the rat was killed after 96 hours. All his patients had been cases of amenorrhœa from various causes, except for 15 normal non-pregnant women taken as controls. His results could be tabulated as follows:—

—	Cases.	Wrong.	Percentage error.
Pregnant women	41	3	7·3
Non-pregnant women ..	15	0	0
Diseased women, with amenorrhœa	43	12	27·9

He found that the reaction rapidly disappeared after delivery. In addition he had collected and analysed 913 cases from the literature with the following results:—

	Cases.	Wrong.	Percentage error.
Pregnant women	452	8	1·8
Non-pregnant women ..	461	15	3·2

His own results differed from those of previous workers in having a higher percentage error among pregnant and diseased women, though he showed an absence of error among non-pregnant women. His error in the former cases could probably have been reduced by microscopic examination of the ovaries. Also the use of younger rats might give more trustworthy results. The test was positive only when fœtal elements were present in the patient. Some observers had found positive results in the case of hydatidiform mole, but he had not done so. In his opinion the test depended upon too many variable factors to be reliable; and if not reliable, it was of no great value.

Dr. VEISNER (Vienna) said that during the last two years in Edinburgh he had helped to establish a pregnancy diagnosis centre based on this test. He did not consider it advisable to reduce the number of animals or to use rats. The anterior lobe of the pituitary produced four hormones, and during pregnancy two of these were also formed by the placenta and appeared in the urine. The test was, therefore, a placental sign. In cases where the production of hormone was too small to give a positive result the pregnancy usually ended in abortion. In their series the percentage error had been 3·02. Some of the negative cases had aborted, as might be theoretically expected.

Dr. E. M. ROBERTSON said that at the Edinburgh centre, of the 400 cases confirmed by the doctors who sent up the specimens, the 3 per cent. of erroneous results could be analysed as follows:—

	Cases.
Unexplained by doctor	5
Evidence of dead fœtus	5
Endocrine disturbance. (Negative result, pregnant patient)	1
Two tests: first, positive; second, negative. (Possibly aborted during interval)	1
Hydatid, positive	4
Ectopic, positive	3
Tubal mole, negative. No villi seen microscopically	2

In two cases of chorion epithelioma positive results had been obtained, and also in one case of previous abortion, where curetting showed scanty fragments of villi still present.

Mr. F. DICKENS said that among 250 cases of pregnant and non-pregnant women tested at the Middlesex Hospital he had found a 2 per cent. error among the pregnant and a 3 per cent. error among the non-pregnant cases.[1] The test had remained just positive as long as 24 hours after delivery. The larger error found by Dr. Hannan was probably due to the use of rats, in which animals spontaneous luteinisation was known to occur.

Dr. O. B. VOGE mentioned the possibility of some chemical test being evolved, which would also throw light on the nature of the Zondek-Aschheim test. Working with bromine water on the lines of the histidine test, he had obtained 86 per cent. of results in agreement with the Zondek-Aschheim test, and on the same cases. If a number of cases of old urines were excluded, his results reached 91 per cent. of agreement.

Mr. H. BURT-WHITE said that he had obtained 9 per cent. of errors in using the chemical test. He had found five out of six positive results in cases of exophthalmic goitre: diabetes mellitus, hæmophilia, and several cases of malignant disease had given positive results.

Mr. RIVETT said that the test was of no value if the percentage error could not be reduced below Dr. Hannan's figure, for only one case in a hundred presented any difficulty in the clinical diagnosis of pregnancy.

The CHAIRMAN, in calling upon Dr. Hannan to reply, said that the test depended on the chorionic elements of the placenta; it was interesting that chorion epithelioma gave positive results. Chemical tests, if they could be made sufficiently accurate, would be extremely valuable.

Dr. HANNAN agreed that the percentage error was too high, but repeated that his cases had been women with amenorrhœa; his findings in exophthalmic goitre had confirmed the chemical tests on the same cases. He doubted whether the error could be reduced below 10 per cent. while the test involved so many variable factors.

Prof. PRESTON MAXWELL read a paper entitled

Further Studies on Osteomalacia.

In diagnosing osteomalacia, he said, deformity should not be remembered as the cardinal sign. There were other and much earlier signs and symptoms which were sufficient to establish a diagnosis, among which were pain in the back and thighs, spasm of the adductors, tenderness and softening of the bones, and muscle irritability. The disease was due to deficiency of vitamin D; or at least this was the case in China, in his opinion. It was observed that large numbers of girls were being brought into the province of Shansi during recent years, and in this province osteomalacia was particularly rife since the famine of 1875. It was probable that these girls were required to supply the places of those who died in childbirth as a result of the disease. In the late stages the deformities became marked, and the patient was liable to die of intercurrent disorders. In the early cases the gait was characteristic, with slight bending of the knees and adductor spasm. Scoliosis and kypho-scoliosis developed as the disease advanced, and a transverse sulcus appeared above the pelvis at the back. Radiography showed the characteristic tri-radiate pelvis, with the ischial tuberosities close together, sometimes associated with multiple fractures, and sometimes with marked bending of the long bones. The reason why fractures occurred in some cases and not in others was not understood; it possibly had something to do with the relation between blood phosphorus and blood calcium. The blood calcium was always low in these cases, but the diffusible calcium varied in its behaviour. In the chest the deformities were usually those associated with kypho-scoliosis; the pelvis showed rarefaction of the bones and rostration of the symphysis, with approximation of the ischial tuberosities. The sacrum became markedly convex, and the tip of the coccyx might approach so close to the ischial tuberosities that between them they obstructed the entrance to the vagina. The long bones showed bending and fracture, and the ribs on palpation revealed soft spots into which the finger sank. In pregnant women the fœtus was also affected; the cord blood calcium at birth might be down to 8 mg. per 100 c.cm. There was a tendency to antenatal rickets, and often the child developed rickets at the same time as the mother developed osteomalacia during lactation. The fœtus often showed marked irritability in utero. The food of these women consisted of corn bread, cabbage soup, rice, and vegetables; all cooking was performed with vegetable oils, and the diet contained no animal fat, meat, or eggs. The women lived indoors and took no exercise. When treated with fresh air, sunlight, cod-liver oil, and irradiated ergosterol, they usually improved enormously, mentally as well as physically. Spasm and pain of the muscles were definite symptoms of the disease, but the speaker was not satisfied that the tetany was a part of the disease at all. He thought that many mild cases of the condition passed undetected, even in this country, and that "funnel pelvis" was often a result of mild osteomalacia. Many cases of pain in the back during pregnancy improved on open-air treatment, full diet, and cod-

[1] See THE LANCET, Jan. 4th, p. 39.

liver oil. Osteomalacia of a marked degree could be cured by similar treatment, and irradiated ergosterol had proved of great value in this connexion; if cod-liver oil was given alone the doses must be very large—over ℥ii a day—but if ergosterol was given as well the dose could be much reduced. There was no excuse for oöphorectomy in these cases, and no evidence that it effected a cure. Operations for obstructed vagina by removal of part of the encroaching bones on one side were often very successful, and led to the renewal of marital relations and pregnancy, with subsequent delivery by Cæsarean section.

Mr. RIVETT said that the treatment of osteomalacia opened a new field of activity for the workers in artificial sunlight and radium therapy, and fresh opportunities for investigation by the biochemists.—Dr. VEISNER said the condition might depend on two factors: lack of vitamin D, and lack of coördination in the endocrine apparatus to supply the conditions for its use. Probably both factors were involved.

Prof. EDWARD MELLANBY said that he was much interested by the evidence of fœtal rickets demonstrated by the radiograms of Prof. Maxwell. He had tried to produce this condition, using pregnant bitches, but without success, since by the time the calcium deficiency was marked enough for the purposes of the experiment the animals died. The results of absence of vitamin D from the diet were aggravated, in his opinion, by the high proportion of cereals taken. Cereals actually increased decalcification, as could be shown by giving oatmeal in rickets, to take an example. Tetany apparently bore no relation to total calcium or total phosphorus, but to some physical condition of the calcium.

Dr. HARRIETTE CHICK said there had been much osteomalacia of a minor degree in Vienna immediately after the late war. It was largely a disease of winter and occurred among the poorest classes; deformities were most marked in the convents, where fat was rare. Cod-liver oil had proved invaluable. Cases had been found among men as well as women. Possibly in China men were also affected in minor degree.

Dr. G. W. THEOBALD said that the disease did not occur in Malaya, Southern India, or Siam, but that cases were found in Northern India among the women who kept strict purdah and seldom saw the sun.

The CHAIRMAN said he was glad to hear Prof. Maxwell denounce oöphorectomy in these cases. The demonstration of the curability of the disease had been striking, but he would be interested to know whether it were not liable to recur on return to faulty conditions.

In replying, Prof. MAXWELL said that the only possible reason for removing the ovaries was that the operation stopped menstruation and pregnancy, and saved a little calcium by these means. It was an inexcusable form of treatment. Many men showed the disease in China. The condition recurred if the patient returned to unsuitable diet and surroundings, but the aim was to train them to avoid this while they were in hospital.

SECTION OF ELECTRO-THERAPEUTICS.

AT a meeting of this Section on Jan. 17th, with Dr. C. A. ROBINSON, the President, in the chair, a paper on

CUTTING CURRENTS

was read by Mr. JOHN ANDERSON (Dundee). These currents, he said, had not received the same attention in this country as in America. But he was sure that surgical diathermy had a wider application in treatment than was at present realised here. It was now 16 years since he had started a clinical investigation on the uses of the cutting current in the ordinary work of the general surgeon. His small Schall apparatus had proved until recently to be the most efficient cutting instrument he had ever tried; he had since tested ten other instruments which were reputed to cut well, but he had been continually disappointed in them. The Cushing-Bovie machine, however, which he had just begun to employ, had a wider range than any other, and he had reason to believe that healing would be equally good with it. Since 1923 he had used diathermy in 98 cases of radical removal of breast cancer, and primary union had been the rule; in only a small number was there delay in healing, or any difficulty in that respect. The group of cases so dealt with also had a shorter stay in hospital than those operated upon with the knife. When there had been some delay in union, it could usually be attributed to some technical inefficiency in the instrument, causing more coagulation and less cutting effect than was desirable, dehydration being consequently excessive. Electrical experts still differed about the exact nature of the various currents produced by the Schall machines. The frequency of the small Schall, as tested with the wireless, was probably over a million, and the waves were practically undamped in character. With the Cushing-Bovie machine the depth of dehydration could only be regulated by using different electrodes or by contact currents. The heavier the electrode the deeper the dehydration, and the more rapidly the active electrode was acting the lighter the dehydration. With this instrument it would now be possible to regulate accurately the amount of dehydration and the rapidity of cutting in the different tissues.

Mr. Anderson said he used the cutting current for all biopsies because he believed it eliminated the risk of spreading cancer cells. Even in cases in which radium was to be used he felt that one could complete the academic picture without increasing the risk to the patient. When the tumour was large he used circumvallation and then excision by the cutting current. When it was small, circumvallation was liable to interfere with the histological appearance of the section.

Results in Malignant Disease.

As regards results in his series of cases, he said he realised that no results of value could be given until at least eight years had elapsed; but up to the present only two of the 98 cases had shown local recurrence apart from a general carcinomatosis; there had been no case of secondary hæmorrhage, nor any instance of marked protein shock. Conversely, there had been much less post-operative pain and shock than with other methods. He thought the absence of post-operative pain after diathermy excision was due to "capping" of nerves after their section. In one case he did a radical excision of the breast at 4 P.M., and at 8 P.M. the patient was listening-in to the wireless. In inoperable cancer he used the coagulating rather than the cutting current. He employed the method for all tumours of the bladder, and cystoscopic control had proved that after its use the healing in this area was especially good. One could frequently see the operation wound when the knife had been used, but the diathermy excision wound often was not discernible. To bring about dilatation of the bladder it was important, in his opinion, to use air rather than water. After opening the abdominal wall one could then see exactly what one was doing, aided by the guidance of the finger. In prostatectomy, by the open operation according to Sir John Thomson-Walker, he had found the diathermy current a great advantage, as compared with suture or ligature, to produce hæmostasis. He had clamped vessels with forceps and simply applied the electrode to the forceps to bring about the local coagulation. He used diathermy for titivating the prostatic bed after ordinary prostatectomy, and he used it also for partial prostatectomy, and even for complete prostatectomy when the gland was small and hard. Further, he used it to make room for the insertion of radium in cases of malignant disease of the prostate; and in none of these prostatic cases had there been any alarming secondary hæmorrhage. For cancer of the tongue he had been employing both the coagulating and the cutting current. In the tongue cases a primary laryngotomy and packing of the naso-pharynx were carried out before the tongue excision was done; this not only gave the anæsthetist a chance,

but also prevented the aspiration of matter into the thorax. In a general way he was able to declare that this method had rendered the risk attendant on operative procedure almost negligible. Most of the patients were able to get up on the second or third day, and left the hospital within ten days. A number of tongue cases were thus dealt with which formerly were pronounced inoperable and were not touched. Diathermy was used, too, for skin, lip, and mouth tumours, hæmorrhoids, and tumours of the vulva, but he had not yet tried it for brain and abdominal tumours.

The method was criticised, said Mr. Anderson, because it was not bloodless. It was not intended to be so; but it reduced the loss of blood by half. Operation was bloodless when the coagulating current was used, but in that case it was unreasonable to expect primary healing. Two types of operation had, therefore, to be considered. When one was cutting through relatively safe tissue and attempting to prevent the manipulative spread of the cancer cell, the arc electrode with its 0·1 mm. dehydration was sufficient to prevent dissemination, for it sealed all lymphatic vessels and at the same time prevented capillary bleeding. A considerable number of cases had been reported in which healing was bad and some sloughing of the wound took place. He was familiar with those cases; they had been associated with a machine which was not working properly or with faulty technique; in other words, coagulation was too deep, and the dead tissue left was in too large quantity for the natural process of repair to overcome.

Future of the Method

It was interesting to inquire why the method was not more used. In this country there was considerable uncertainty about the exact nature of the currents, their effect on tissues, and the varieties of current produced by different machines. Satisfactory liaison was lacking between the electro-therapeutist, the surgeon, and the electrical expert who designed or built the machines. Some of his colleagues wished to establish the method in their clinics, but found a difficulty in procuring an efficient machine which would yield a uniform output. Until recently, with an alternating current he had not been able to get an efficient cutting effect. Until machines were properly standardised, diathermy for surgical purposes would not take the place in this country which it ought to have. The surgeon was not willing to hand over his material to the electro-therapeutist—for what he often considered might be experimental purposes—with the result that he might be using a machine which did not carry out the best work. In Europe very few machines had been produced which gave a first-class cutting current under control. He himself had enjoyed the close coöperation of Mr. G. H. S. Milne, and he thought that it was essential to work with a technician in this way. It might be possible to answer such questions as: What is a spark? What is its effect on tissue? Does it affect by electrical means the staining agents? What is the effect of the electrical current on the local anæsthetic which is impregnating the wound? He had been much disappointed with local anæsthesia in association with the use of the cutting current. Some patients complained of pain in such circumstances, and then resort to the knife eased the pain. In examining histological changes in the cells after the use of the diathermy current he would prefer to make a series of sections by immediate freezing, instead of by the prolonged hardening method.

The Cushing-Bovie machine, which Mr. Anderson demonstrated, seemed, he said, to be a long way ahead of any other he had tried. The amount of dehydration seemed to depend almost entirely on the nature of the damping of the wave; a purely undamped wave seemed to give almost the same effect as a scalpel. He had never used more than half of the possible power of this machine, and that was for sealing vessels. Most of the surgical work was done with 35 per cent. of the total power. Cartilage could be cut well with a high voltage. He had been able to cut out a shelf of an ox's femur with a simple wire snare, as if it had been cheese. For dealing with fat, a heavy dehydration was best. In conclusion, Mr. Anderson said that surgical diathermy would do all that the scalpel could do in the treatment of malignant disease, and had certain advantages over the scalpel. What was needed was a standard portable relatively cheap and relatively fool-proof apparatus. The present machine was not portable nor cheap, but the method was absolutely safe.

Discussion.

Mr. E. P. CUMBERBATCH said it was one of the functions of medical officers in charge of electro-therapeutical departments not only to administer electricity to such cases as were sent to them by the staff, but also to keep them in touch with new electrical methods. He had first seen this cutting method in the clinic of Howard Kelly, of Baltimore, and then he learned that the same means was being used by Mr. Gordon Taylor at the Middlesex Hospital. Afterwards he got to know that the latter learned the method from Mr. Anderson, of Dundee. He, Dr. Cumberbatch, implored every candid man who desired help for himself or his neighbour to make a thorough investigation of this method. At present the majority of surgeons in London were using radium in treating malignant disease, but surely there was a place here for the cutting current.

Dr. G. B. BATTEN urged that such team-work as had been mentioned should commence immediately; wireless was a good example of a demand producing in a very short time such investigation as had resulted in a great accession of knowledge.

Mr. H. P. GOUGH said he hoped to profit by Mr. Anderson's lecture in the designing of future apparatus. On behalf of Messrs. Watson and Sons he offered the best possible coöperation towards the attainment of perfection of apparatus.

Dr. J. B. COOK suggested that the apparatus had other uses in the profession than in operating for malignant disease. He asked whether it could not be used for operations on bone, as in removing portions in osteomyelitis. Perhaps it could be used for mastoid operations also, in which hæmorrhage was often a trouble.

Dr. C. G. TEALE pointed out that in using the Schall machine it was important to keep the electrode in motion, otherwise a slough formed, and that interfered with rapid healing. At the hospital he was connected with, a surgeon who had been working with Dr. Harvey Cushing in America was anxious to use the method for dealing with cerebral tumours, but in preliminary experiments he found it difficult to keep the electrode moving quickly enough for this cerebral work.

Prof. GEOFFREY HADFIELD said he was a member of a team of the kind which the opener and several other speakers referred to, and that team had been carrying out a research, chiefly on animals, because working on dead meat did not afford information as to what happened in the tissues. What was needed now was a widespread propaganda among surgeons, who should learn what the method could accomplish; this would obviate poor results from coagulating currents, which inevitably delayed healing. The result so far was a bias in favour of the diathermy knife in comparison with the ordinary knife in the matter of recurrences after operation.

Mr. E. W. RICHES, speaking as a former house surgeon to Mr. Gordon Taylor, said the sealing of the vessels by this method obviated the need for applying numerous ligatures. There was a danger that cartilage would necrose if touched with the diathermy knife.

Mr. ANDERSON, in reply, said he had only known this Cushing-Bovie machine for ten days. With the Schall apparatus it was necessary that the knife be kept moving, preferably with a movement as if making a rapid sketch. As soon as movement was slowed or stopped a coagulating effect occurred. With the Schall machine a pure cutting current was not used.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

A MEETING of this Society was held on Jan. 16th, the chair being taken by Dr. G. CARMICHAEL LOW, the President. Prof. MAX H. KUCZYNSKI (Berlin) read a paper by himself and Dr. BIANCA HOHENADEL on the

ÆTIOLOGY OF YELLOW FEVER,

with special reference to the problem of insect-borne disease. An abstract of this appears on p. 180.

The PRESIDENT sketched the chequered history of research into the ætiology of the yellow fever organism, and emphasised the caution which must be observed before coming to a conclusion.

Dr. J. A. ARKWRIGHT wished to know further details about the bacillus; how it was possible to distinguish it in culture from other diphtheroid bacilli, and whether it had an exotoxin which could be separated by filtration. He also inquired the criterion by which Prof. Kuczynski decided the presence of yellow fever in an animal, and suggested that Prof. Kuczynski's method was somewhat unnecessarily complicated. He understood that in typhus cultures which began as cocci changed to something which, if it was not exactly proteus X. 19, resembled it. This meant that bacteriologists were called upon to accept an entirely new idea, and one that required searching criticism. At the same time, proteus and rickettsia both had a fundamental relationship to typhus fever; the change must take place somewhere, and it was perhaps begging the question to criticise the change which was alleged to occur in vitro. It was necessary, however, to take care that one's faith in the unity of the two types of organism did not carry one away into accepting these extraordinary changes without question.

A Secondary Organism?

Prof. E. HINDLE proposed to criticise not the facts related by Prof. Kuczynski, but his interpretation of them. In the first place, it was true that in the normal course of events an animal infected with yellow fever had a fairly regular temperature chart. As a rule the temperature went down quickly, but by no means always; exceptional cases were constantly being reported of long incubation periods and long atypical fevers, with animals succumbing up to 23 days. From these atypical infections it was possible to recover typical infections, but as these atypical courses were usually reported in man, the results in animals should not be accentuated too much. The ordinary infection with a rise of temperature on the second or third day, and then two days afterwards a sudden drop and death, was strikingly different from the infection in which the rise lasted for seven or eight weeks. He himself, however, had seen incubation periods as long as 12 days, and the temperature charts should therefore not be regarded as indicating any important difference between infections with virus and infections with the bacillus. Assuming that an injection from a culture might contain a very dilute or attenuated virus, a fever or infection of this type might reasonably be expected.

A fact which might explain many of these results was that, in yellow fever particularly, destruction of the liver was one of the important features of the disease. Work on ketosis had shown that when the liver was infected the animal became especially liable to infection with secondary organisms. Various species were particularly liable to various kinds of secondary organisms, and it was conceivable that a monkey infected with yellow fever might be infected fairly constantly by the same secondary organism. Secondary diphtheroid infection might therefore occur with a certain amount of regularity, although its connexion with the disease was only accidental. Mr. Hindle had been carrying out experiments to determine whether it was possible for the virus to be associated with bacilli; he thought there were some grounds for believing that it could. On broth and agar, both aerobically and anaerobically, the organism departed from the small form and became somewhat larger, more closely resembling Hoffmann's bacillus. If the bacillus were mixed with the virus by soaking in it for a day or two and then washing, virus would be absorbed. The bacillus itself would then produce no infection, but the washed bacillus would. Prof. Kuczynski, he supposed, injected an amount of virus approximately equivalent to 1,000,000 lethal doses, corresponding to a gramme of tissue or a cubic centimetre of blood. If subcultures were made, presumably a dilution was taking place from tube to tube, and by the sixth or seventh subculture there was practically no chance of any virus remaining. Assuming, however, that all the virus was concentrated in the bacilli, so far from diluting ten times when making a subculture, the amount of virus might be only halved, or reduced by even less. This would explain the achievement of positive results with subcultures up to the thirteenth or fourteenth passage.

It might be objected that the virus could not live so long. Actually, however, it would live in glycerin for months. The known properties of the yellow fever virus were very peculiar ones for a bacillus. On the one side was extraordinary resistance, and on the other fragility. It resisted glycerin and cytolytic agents, though it formed no spores. On the other hand, it was very susceptible to acidity, and died when the pH was lowered to about 4. All this evidence suggested that yellow fever was caused by a virus rather than by a bacillus of the kind suggested, which, if it resembled the diphtheroids, might be expected to resemble them in its physical properties.

With regard to sublethal doses: when the minimum lethal dose was approached, certain animals seemed to show infections without any obvious signs of disease. Mr. Hindle did not see why these infections by the bacilli should be of any particular consequence. It was not necessary to assume a bacillus different from the virus. The infection of an animal with monocytes from a recovered patient brought yellow fever into line with other virus diseases, and was an extremely important and interesting piece of work. So far, however, from providing evidence in favour of a bacterial causation, it favoured the virus theory. He supposed that the monocyte was the refuge of the residual virus which was so common in animals and patients who had recovered from yellow fever, and that the washing had simply removed the bodies which had prevented the latent infection from being shown in the previous experiments.

Further Criticism.

Prof. J. C. LEDINGHAM did not think that Prof. Kuczynski's evidence was at all convincing. He asked for definite information on whether the organism was capable of infecting a susceptible animal. He had gathered that the virulence of the organism was highly capricious. If that were so, he inquired whether there were any serological connexion between the organism and the human serum and that of recovered or immunised monkeys. Diphtheroids were rare organisms, but had given an enormous amount of trouble through the fact that they were found in the cultures after prolonged incubation. It was important that no causal significance should be attributed to these organisms without strict proof. It was, however, true that some of the diphtheroids were capable of infecting guinea-pigs and might produce the lesions described. The suggestion of an ultramicroscopic virus developing on cultivation into an ordinary micro-organism was novel. To take one example, the pleuro-pneumonia organism of cattle could be cultivated in tissue and was capable of developing colonies in artificial media, but it did not grow bigger or become microscopically visible.

Dr. G. W. M. FINDLAY mentioned one virus disease which was capable of being associated with secondary

bacteriological infection. This was the virus myxomatosus in rabbits. He asked whether cultures had been taken from normal monkeys to see whether any diphtheroid organisms could be grown from them, and whether any controls were made on the rabbit's heart and kidneys to see whether they were inoculative to diphtheroids. Some viruses, he said, could survive a considerable time at 37° C., particularly the agent of the Rous sarcoma, which sometimes survived for a week in partially aseptic cultures similar to those used by Prof. Kuczynski. If a serum immune against a virus were mixed with the virus and the mixture inoculated, no infection followed. He asked whether this had been tried with the yellow fever organism.

Dr. HAROLD SCOTT gave an account of a paper by a Portuguese research worker on this subject, who had isolated from two human cases no less than 27 different organisms which he had enumerated under various index numbers. In particular this worker had found that the serum of recovered cases agglutinated a particular organism to a titre of 1 in 60. The speaker asked whether any cultivation experiments had been done with the serum of recovered cases by Prof. Kuczynski, and whether he had tested the Costa Cruz reaction for reduction of complement, which seemed to be absolutely certain in yellow fever. The organism, he thought, might be analogous to proteus X. 9 in typhus, or pneumosintes in influenza. These organisms had to be regarded with extreme caution. It must be clearly established that the bacillus was neither a concomitant nor a contamination, and that it was ætiologically connected with the disease.

Dr. C. FLETCHER said that Prof. Kuczynski had not mentioned whether any rhesus monkeys which had recovered from the infections produced by the bacillary strains had been tested for immunity with inoculations of the virus. The importance of this work seemed to go much further than yellow fever. If it was correct, Koch's postulates went by the board, and old-fashioned bacteriologists received a profound shock. The whole question should be investigated further forthwith.

Dr. C. C. OKELL remarked that, when working with Mr. Hindle, he had cultured the liver from a great many monkeys. He had, it was true, sometimes grown as many organisms as Dr. Scott's Portuguese worker, but under ideal conditions he never isolated anything, and did not believe that a bacterium had anything to do with yellow fever. If Prof. Kuczynski's work on the susceptibility of the guinea-pig were confirmed it would mark an entirely new era in laboratory technique. He only knew that he had injected a cubic centimetre of a vaccine, 1/10,000 of a gramme of which had killed a rhesus, into 12 guinea-pigs; after the whole staff had become tired of watching them they had been killed and found in prodigious health. Diphtheroids were the most treacherous of organisms, and of all bacteria which could be connected with yellow fever they were the class to be treated with the greatest respect. He required further evidence of their ætiological importance.

Reply.

Prof. KUCZYNSKI replied that his criterion of yellow fever was the typical picture familiar to all those who had studied it. Costa Cruz had never maintained that his reaction was at all regular in rhesus. Prof. Bergmann had found that certain human cases showed a loss of complement. There was no destruction of the liver in guinea-pigs, but typical infections had been caused in rhesus monkeys after the fifth passage of the virus through guinea-pigs. Most of the infections had been long. Eight per cent. of monkeys produced new cultures if a very pure strain of virus was used, but the organism was not at all like the diphtheroid described in this paper. He had found absolutely nothing else. Purity of cultures depended upon the scrupulous care of the animals and the purity of the virus used. His experiments had fulfilled both these conditions. Careful tests had all been made with the contents of non-inoculated tubes before an inoculated tube was used. Material was only put into tubes which had been carefully tested for cleanliness. If these precautions were neglected, there was no wonder if a multitude of different organisms appeared in the culture. In reply to the suggestion that diphtheroids were not pathogenic, he could only point to his results, which he offered to repeat in the laboratory of a critic. Experiments on the toxin were nearing completion. Typhus could not be cultivated on his medium with human ascitic fluid.

CHELSEA CLINICAL SOCIETY.

A MEETING of this Society, on Jan. 21st, with Mr. L. A. HARWOOD, the President, in the chair, was devoted to a discussion on

SWEATING.

Dr. C. E. SUNDELL, in opening, pointed out that the text-books made a number of diverse statements about the content and nature of sweat, and he thought their lack of agreement was largely due to the fact that different workers made their observations on different types of person. For instance, one book said that sweat was alkaline, another that it was neutral, and a third that it was universally acid. He thought that if the sweat were regarded as "cutaneous urine" this would give an explanation of the various reports on its composition. The best and most recent work on the subject stated that sweat was always slightly acid in reaction, just as the normal urine of a healthy person was always slightly acid. The degree of acidity of the sweat varied in different parts of the body; on the forehead, for instance, it was less acid than on the feet. Naturally, it was on healthy persons that most of the physiological work on the subject had been done; when dealing with certain forms of disease striking differences were noted. For example, with an angry big toe and a temper to match, the skin over a gouty joint was dry and hot, but if it was moistened and its reaction was tested, it would be found to be intensely acid, whereas the fellow big toe, which was healthy, would only show faint acidity.

Acute Rheumatism and its Treatment.

Dr. Sundell's own work on the subject had been mainly on sweating as a curative measure in rheumatic affections. Rheumatism seemed to be associated with some alteration in the activity of the skin. Patients with acute rheumatism were well known to sweat profusely, and their sweat was very acid. There was, however, an important exception to this rule—namely, acute hyperpyrexia. In this condition the patient who probably reached a temperature of 108° or 109° F. before he died was the patient who did not sweat. Two years ago he had a good example of that in hospital. The patient had a definite acute attack of rheumatic fever, with a temperature of 108° F., and his skin was bone dry and it was covered with tiny miliary lesions looking like blisters. The contents of these were acid, and he supposed the fluid in them was sweat which had not reached the surface. This patient failed to react to the many measures taken with the view to making him perspire, and he died, Dr. Sundell thought, because he did not sweat. Very probably the child of rheumatic tendency had gross imbalance of the cutaneous secretions. Sometimes the skin was dry, sometimes there were night sweats. Night sweats did not always mean that the particular patient was tuberculous. Broadly, it could be said that the rheumatic case of the chronic or subacute type perspired but little, whereas the acute type did so profusely and copiously.

He wished to speak particularly of the treatment of cases of rheumatism, and to relate a method, not

his own, which he had found very successful. Suppose that a youth, aged 16, came into hospital with inflamed joints and with a temperature of 102° or 103° F. Probably the physician said, "Let us give him salicylates, bring his temperature down, and cure him." That was the course Dr. Sundell had himself adopted until he "saw the light." His present practice in these cases was to refrain from giving salicylates and to keep the patient warm in bed and promote sweating as much as possible—i.e., leaving the fever without any active treatment. If the patient did not sweat as freely as was desired perspiration could be increased by means of baths. On this treatment he had found that these cases of acute rheumatism cleared up extraordinarily well, and for good; for after this treatment he had not had the relapses and disappointing recurrences which were all too frequent after the salicylic régime. This warm bed and sweating treatment was that which was mostly relied upon before, about 1870, salicylates were first applied as a medicine to disease; the patients were given some alkali, put to bed, and encouraged to sweat, opium being administered if the pain was very severe. Dr. Sundell did not agree with those who said these children were suffering from an exacerbation of a smouldering infection; he did not think the lingering rheumatism in children had any relation to microbes.

As to the eliminative effect of sweating in other conditions, the older physicians, and some now practising, regarded sweating as one of the best means of protection against mercurialism when mercury was used in the treatment of syphilis. Especially if the sweating measures were accompanied by the use of vapour baths, stomatitis and other mercurial manifestations could usually be kept well at bay. An important part of the subject under discussion was the cause of night sweats and the best means of treating them. He recently had under care a tragic case in which night sweats were a striking feature; there was drenching perspiration several times a night. It was a case of advanced carcinoma, leading on to generalised carcinomatosis, and during the last three months of life the sweating was one of the most distressing features. A very large number of means were tried to stop it, but without any success until a homœopathist came along and suggested arsenic. Forty-eight hours after this was given the sweating stopped; Dr. Sundell could not explain why. Moreover, it did not recur for three weeks, and was then amenable once more to arsenic. The case just related had a gynæcological origin, and he had heard it said that the sweats associated with the climacteric were confined to the head and trunk, the arms and legs not being involved. He would like to know whether that statement was true.

Functions of the Skin.

Dr. HENRY MACCORMAC said that when he was being taught dermatology he was led to believe that the skin was a gas-tight and water-tight envelope in which there were a number of sweat and sebaceous glands, and that the function of the skin, apart from them, was a protective one, shielding the body from external agencies, chemical, physical, bacterial. Sweat was said to be subordinate to the functions of the kidneys and little notice was taken of it. Santorius, a contemporary of Harvey, devised an ingenious balance on which he lay for days measuring the intake of food and fluid and weighing his excrement, and much of his results, arrived at after 30 years, stood at the present day. That authority described "sensible perspiration" and "insensible perspiration." By the first he meant the appearance on the skin of droplets of sweat, a condition which developed when the external temperature rose to or beyond 33° C. Experiments had shown that at the time this occurred there was a considerably increased discharge of CO_2 in the blood—i.e., about four times more than before. A French worker applied dry paper to his skin, allowed it to remain in contact with the skin 30 minutes, then soaked the paper in silver nitrate and exposed it to the sun. There then appeared on the paper a number of white spots or points, which were caused by the sodium chloride in the sweat, and he said those points corresponded with the orifices of the sweat ducts and that insensible perspiration was given off during that period. He went further and applied belladonna and atropine to the skin, and demonstrated that where these had been applied this phenomenon did not develop. There was a congenital ectodermal effect in which people had a total absence of sweat glands, and in such persons investigations had been carried out on the effects of heat. It had been shown that in their case both water and CO_2 could pass through the skin; thus one could conclude that the skin allowed water and CO_2 to pass through it independently of sweat glands. This had been more recently confirmed by Prof. J. S. Haldane in his work on miners and others who worked in high temperature conditions, and therefore sweated profusely and drank large quantities of fluid. In the form of sweat these men passed out large quantities of sodium chloride, so that they actually suffered from a deficiency in the body of that compound, and this deficiency gave rise to a train of symptoms, such as cramps, debility, and weakness. Haldane had shown that this insensible perspiration could occur apart from the mediation of sweat glands. Miners got over the tendency to cramps and debility by eating some form of salt diet, such as kippered herring or kippered bloater in the morning.

Dr. MACCORMAC thought it important not to consider the sweat glands alone as such, but to take into account also the sebaceous glands, which were equally important and which worked with the sweat glands; indeed, the sebaceous glands could take on the function of the sweat glands. The sebaceous glands poured out a secretion on the skin which acted as an important protective substance; and he had often wondered whether the modern habit of taking one or two hot baths a day, accompanied by the liberal use of soap, did not remove from the skin this substance and possibly pave the way for a number of dermatological conditions. Sabouraud mentioned the case of a mother of seven children who brought three of them for a skin condition, which was thought to be contagious. It was found that only these three were attended to by an English nurse, and the condition of their skin was attributed to the assiduity of her washings. It was interesting to reflect that ringworm of the scalp died out at puberty. So far as he knew there was no physical or chemical change in the hair of the head at that time, yet, when that time of life was reached, something made the hair an unsuitable medium for the growth of the ringworm fungus. He thought that pointed to something developing in the sebaceous glands to bring about this change. And there was probably a variation in the constitution of those glands in various parts of the body, because although a man was no longer able to develop ringworm on the hair of the scalp he could easily develop it on the beard, and very seldom did ringworm develop in the hair of the moustache. Possibly something similar obtained in sycosis. The sebaceous gland secretion could often be modified by small doses of X rays.

Discussion.

Dr. R. A. YOUNG, referring to the treatment of acute rheumatism, said that before the introduction of salicylates the treatment of that disease was stated by a cynical Guy's physician to be "six weeks," and the speaker thought that was a more effective treatment than that now adopted. As to Dr. MacCormac's remark concerning sites of selection for ringworm, if members of medical societies would bring forward puzzling cases and facts, as well as their experiences, more real research would be done in this way than was often done in laboratories, valuable though the latter was. A man who made a brilliant diagnosis of a case did more real research than did the man whose life was spent amid test-tubes. In

the early years of his Brompton Hospital experience night sweats were a great trouble, and they resisted the various drugs and other efforts. They were not now a real trouble, for these tuberculous patients who suffered in this way were placed on a rush bed near a window. Yet the most striking example of sweating which he had seen in recent years was in a case of pulmonary tuberculosis. For this patient artificial pneumothorax was tried, but had little effect. Sanocrysin did improve it, but after four doses the benefit passed off and the sweating was as severe as ever. Then his house physician put the woman into a modern hot-air apparatus, and she was able to turn on and off at will the electric bath. This did her good, and the sweating subsided a good deal. He had since seen another case of sweating very considerably relieved by this apparatus. That the skin supported and supplemented the secretion of the kidneys was an idea which was considerably supported by the facts, and it accounted for the benefit derived from hot-air baths in renal disease.

Dr. R. L. J. LLEWELLYN spoke of the great susceptibility of rheumatic subjects to changes in the weather, and argued therefrom the need for special care of the skin, particularly in inuring it to tolerance by alternations of heat and cold, always concluding with a cold douche, to tone up the skin. All patients were questioned about the action of their bowels, but their skin functions were seldom inquired into. Nature was always trying to restore the endocrine balance. Patients with acute rheumatism could be said to have the sweating diathesis.

Dr. F. J. MCCANN said that in the treatment of the sweating seen in women at the menopause he had found great benefit from ichthyol.

LIVERPOOL MEDICAL INSTITUTION.

AT a meeting of this institution on Jan. 9th a paper on

Low Blood Pressure

was read by Dr. E. NOBLE CHAMBERLAIN. After dealing with the physiological principles underlying the maintenance of normal blood pressure, he described the various ways in which the blood pressure can be reduced in disease, as by weakening of the myocardium and diminution of vasomotor tone. First, however, he called attention to the occurrence of low blood pressure in normal people. In a group of 60 medical students and doctors, of ages varying between 18 and 33, as many as 15 showed systolic pressures below 110 mm. They appeared to fall into two groups, one with good physique, athletic habits, and complete freedom from symptoms, and the other, who were subject to minor circulatory disturbances such as chilblains and cold hands, and were often of a neurasthenic disposition. The former group were in no way below par either physically or mentally, and were capable of both sudden and sustained efforts. In view of the hypotension in this group it was considered not proven that the circulatory disturbances in the second group were necessarily related to the hypotension. Shock and hæmorrhage, said Dr. Chamberlain, illustrated types of extreme hypotension which might be fatal if the systolic blood pressure fell below 60 mm. The low blood pressure in these cases was due largely to diminution of blood volume, resulting from increased vasomotor dilatation, and increased permeability of the capillary walls, which possibly occurred from the toxic effects of histamine-like bodies produced at the site of the trauma. Direct diminution of blood volume occurred in hæmorrhage. In acute infections, such as diphtheria, pneumonia, and typhoid, the blood pressure usually fell gradually during the illness, slowly rising again during convalescence. Sudden drops were usually of ill omen, indicating the presence of such complications as cardiac failure in pneumonia or hæmorrhage in typhoid fever. Sudden rises were also apt to occur in the acute delirium of pneumonia or the perforation of typhoid ulcers. The cause of the hypotension in these conditions was probably to be sought in the effect of bacterial toxins and of the products of bacterial activity in the tissues on the vasomotor system—a theory with some experimental substantiation. In chronic infections hypotension was very constantly present in tuberculosis, and was usually proportionate to the severity and activity of the disease. In a series of cases investigated by Dr. Chamberlain there did not appear to be any direct relationship between the temperature and the hypotension, though low blood pressure was nearly always present when the patient was much emaciated. The hypotension in these cases was partly due, as in acute infections, to the effect of bacterial toxins and the products of bacterial action on the tissues, but might, he suggested, be due to histamine-like substances formed in the process of caseation. In cardiovascular diseases it was to be noted that hypotension was comparatively rare, except as a terminal event. In 100 cases analysed by Dr. Chamberlain there was only one case of hypotension—a patient who died 12 hours later. These cases were divided into: mitral disease, 29; aortic disease, 42; myocardial disease, 29. Cases were only accepted as myocardial damage which showed gross electrocardiographic changes such as heart block and bundle-branch block. Dr. Chamberlain, however, called attention to the fact that in a number of cases of infective endocarditis examined by him the blood pressure was low in about half the patients and never above normal, although the majority of cases were lesions of the aortic valve where high systolic pressures were usual. He considered, therefore, that hypotension in valvular disease of the heart, unless accompanied by marked signs of cardiac failure, is suggestive of infective endocarditis, particularly if the course of the blood pressure is progressively downwards. Here, as in all cases, the value of knowing the individual's blood pressure variations in health was to be emphasised. That a fall in blood pressure would occur in infective endocarditis was to be expected, when one considered the frequency of hypotension in other infections. In endocrine disorders it had long been known that hypotension was a common feature of Addison's disease, but cases had been described recently where the blood pressure remained normal in spite of the advance over many years of all the other characteristic symptoms of the disease. This, and the experimental evidence that destruction of the suprarenal medulla in animals was often accompanied by no ill-effects and that the amounts of adrenalin in the blood of normal beings was not sufficient to produce vasoconstrictor effects, made untenable the theory that the low blood pressure of Addison's disease was due to deficiency of adrenalin owing to destruction of the suprarenal medulla. The cause of the hypotension remained unexplained. In cases of pituitary insufficiency, as in Fröhlich's syndrome, low blood pressure was also common, probably owing to lack of pituitrin which might exert a pressor effect in the normal animal.

In speaking of treatment Dr. Chamberlain followed the lines of his article in the series on Modern Technique in Treatment in THE LANCET (1929, i., 889).

MERSEYSIDE HOSPITALS.—Last year the ordinary income of the Liverpool Voluntary Hospitals was £286,464, and the expenditure £314,337, leaving a deficit of £27,873. The necessitous persons who were treated without any payment numbered 8000; their aggregate stay was 138,000 days. The four Liverpool Hospitals spent £6600 in dressings, and £7271 in drugs. There were 10,445 cases for X ray treatment, and 480 for radium treatment, and 17,544 operations were performed. Attendances for electrical massage treatment were 127,121 and for artificial sunlight 11,605. The annual cost of the maintenance in hospital of persons unable to contribute to the penny-in-the-pound fund is stated to be at least £70,000.

Reviews and Notices of Books.

PROBLEMS OF NEUROSES.

By ALFRED ADLER. With a Prefatory Essay by F. G. CROOKSHANK, M.D., F.R.C.P. Edited by PHILIPPE MAIRET. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1929. Pp. 178 + xxxvii. 8s. 6d.

Dr. Crookshank opens with a lively criticism, in which most psychopathologists would concur, of what Biot has called the necrological and veterinary schools of orthodox medical thought. He then points to a great, though unofficial, therapeutic advance, instanced in the new methods by which the cardiac neuroses—sources of suffering and wastage greater than that due to the so-called "organic" heart diseases—have, after centuries of neglect since Harvey's time, become more amenable to treatment than are fibrillation, heart-block, and flutter. Believing that the most important contribution to the psychological school of medical thought will prove to be due to Alfred Adler, he gives a description of that physician's theory of organ inferiority, as applied to physical dysfunction and disease or the development of neurosis. Then follow an account of individual psychology and an eulogy of Adler "who, in easy, pleasant, simple sentences, helps us to solve the greatest and most important problem of all, that of understanding human nature." The case-histories related by Adler himself emphasise his view that the neurotic symptom is designed for an end; they show, too, how the psychotherapist, by convincing the patient of this end, induces him to renounce it and take up anew the task of life. Adler's ready insight into human motives is manifest, and we can picture him successfully leading the patient along the road to self-understanding. It is difficult, however, to find any relation between his methods or views and psycho-analysis, although Dr. Crookshank tells us that the Freudian methods of investigation are frankly accepted by the author. It is true that he offers his interpretations of patients' dreams, but there is no hint of the revival of emotional memories not already accessible to consciousness—which is, historically and practically, the foundation of psycho-analysis, the key to the comprehension of the theory of the unconscious. The influence of such memories in the production of symptoms is equally ignored by Adler. The neglect of this aspect leaves, as it were, a naked-eye pathology, easily understood because it remains on the level of consciousness already familiar to us and makes no demands upon new conceptions of mental processes, but unsatisfying to anyone whose work has forced him to use such conceptions. There is ample scope for the application of Adler's methods among the multitudes of neurotic patients, but his theory covers only a part of our knowledge of psychic mechanisms.

A MANUAL OF MIDWIFERY.

For Students and Practitioners. Fourth edition. By HENRY JELLETT, B.A., M.D., F.R.C.P.I., L.M., late King's Professor of Midwifery, Trinity College, Dublin; ex-Master of the Rotunda Hospital; and DAVID G. MADILL, B.A., M.B., B.Ch., B.A.O., L.M., Gynæcologist to Adelaide Hospital, Dublin; ex-Assistant Master of the Rotunda Hospital. London: Baillière, Tindall and Cox. 1929. Pp. 1281. 25s.

EXTENSIVE revision has been found necessary in the preparation of this fourth edition of the Manual of Midwifery, and the authors have not hesitated to make use of experts in special subjects, while numerous recent references are given. The book, in fact, is up to date and complete in the letter of obstetrics; it is therefore regrettable that its spirit remains that of the obstetrics of ten years ago. The preventive side of midwifery is not given the prominence which it now deserves, and the inclusion of chapters on the various aspects of midwifery treated from this point of view would greatly enhance the value of the work. It is, however, well arranged and clearly written; its chief appeal will be to the post-graduate student and to the teacher.

In the main, the teaching is that of the Rotunda, although the book is not merely an exposition of Rotunda methods without due reference to others. It has one fault, besides the neglect of the preventive side, which is common to most text-books on midwifery; the minor abnormalities found during pregnancy are not given sufficient prominence. In practice major diseases and abnormalities are rarely missed, and usually receive correct treatment by the practitioner; but the minor degrees of disproportion, doubtful cases of postmaturity, and signs suggestive of early toxæmia tend to embarrass the medical adviser, especially when the text-book of his choice has not warned him of the frequency with which he will have to deal with them.

It is almost impossible to combine in one work definite teaching in preparation for examinations, instruction for the practitioner, and a philosophic outlook which will embrace the preventive as well as the curative side of any branch of medicine. This work succeeds in providing the first two of these in good measure, and readers must be content to look elsewhere for the third.

HYGIENE AND PUBLIC HEALTH.

(*Parkes and Kenwood.*) Eighth edition. Revised by HENRY R. KENWOOD, M.B., D.P.H., Emeritus Professor of Hygiene and Public Health, University of London; M.O.H., Bedfordshire; and HAROLD KERR, O.B.E., M.A., M.D., D.P.H., Professor of Hygiene and Public Health, University of Durham; M.O.H., City and County of Newcastle-upon-Tyne. London: H. K. Lewis and Co., Ltd. 1929. Pp. 823. 21s.

THIS manual was originally written by Dr. Louis C. Parkes, with whom Prof. Kenwood entered into collaboration in later editions, and now Prof. Harold Kerr has joined with Prof. Kenwood in bringing it up to date. Many passages have been deleted and the space filled with new material, the editing having been so cleverly done as to provide connected teaching; thus "Parkes and Kenwood" retains its high place in the rank of text-books in public health.

A book of this kind will always show variations in quality depending on the personal interest of the authors in the different branches of public health. We find, for instance, that the chapter on air and ventilation is excellent, although the description on page 154 of the relation between ventilation and diphtheria is not very scientifically expressed. The chapter on warming and lighting is likewise very good, although here, too, one misleading statement is made at the very commencement, which gives the impression that the desideratum in a good heating system is warming of the air. It would appear desirable to avoid reference to such commodities as smokeless fuel by commercial names, since many of those sold under proprietary names are of equal merit. In the chapter on infection the discussion of susceptibility and immunity is hardly adequate. No attempt is made to estimate the significance of modern observations on the transmission of communicable diseases in relation to mass immunisation by unrecognised infections. In places throughout the book various means of attaining an object are described without discrimination as to their relative value. This criticism, for instance, applies to the descriptions of the treatment of swimming-bath water with "electrolytic fluid" or continuous filtration. In the same chapter considerable space is given to the description and illustration of the sterilisation of water by means of ultra-violet radiation; if, as we believe, this is a very costly method, it is desirable that students should be told so. It is not strictly

accurate to say that glass is a complete absorber of ultra-violet rays. On page 210 a reference to carbonic oxide appears to be intended for carbon monoxide.

In noting a few points for criticism we do not want to imply that they are important. The book in its revised form will be justly valued by all advanced students of public health and it will be used for reference in public health departments throughout the kingdom.

English Public Health Administration. By B. G. BANNINGTON, Sanitary Inspector, County Borough of West Ham. London: P. S. King and Son, Ltd. 1929. Pp. 325. 12*s.* 6*d.*

THIS second edition of a very useful work appears at an appropriate time in view of the reform of local government which the Act of 1929 is intended to bring about. Mr. Bannington has brought his book into line with present day public health law and practice, though fully aware that consolidation of the law will soon make it out of date. The range of the service is well covered, although the more modern and specialised medical branches of the work, such as those concerned with the health of school-children, venereal diseases, and mental deficiency, receive rather scant notice. The significance of the expansion of these important services might have been utilised more freely to emphasise some of the points the author sets out to make. Apart from this, the book contains much valuable information, some of which will be new even to those who administer health departments and teach methods of administration to others. It should find a place in the library of every medical officer of health, and will convey to students of public health a vivid idea of the service for which they are preparing.

INFECTIOUS DISEASES AND OTHER FEVERS IN INDIA.

A Manual for Students and Practitioners. By PURSHOTAMDAS T. PATEL, M.D. Lond., M.R.C.P. Lond., D.T.M. & H. Cantab., Medical Superintendent, City Isolation Hospital and Maratha Plague Hospital, Bombay. Calcutta: Butterworth and Co. 1929. Pp. 784.

THIS is a handbook on fevers for the use of students and practitioners in India. The impression conveyed by a perusal of the book is that the material is incompletely digested and hastily arranged. Misprints are frequent, especially when the writer deals with scientific nomenclature. The reader will find much to criticise in the distribution of space. For example, a discussion of yellow fever, a disease which has never occurred in India, is included, while only two pages are devoted to undulant fever.

JOURNALS.

BRITISH JOURNAL OF CHILDREN'S DISEASES. Vol. XXVI. October–December, 1929.—In a paper on Experimental Pyelitis and its Relationship to Urinary Infections in the Infant Dr. H. F. Helmholz, of the Mayo Clinic, records experiments on rabbits which seem to favour the ascending mode of infection. The frequency of infection of the bladder, as compared with infection of the upper portion of the urinary tract, together with the fact that the colon bacillus after intravenous injection does not persist in the bladder when the upper part of the urinary tract is sterile, seems to indicate that in the rabbit the infection is of the ascending type. Although results from experiments on animals cannot be directly applied to man, there is enough confirmatory evidence from what is known of pyelitis in infancy to warrant the assumption that infections with the colon bacillus take place in the same way. In conclusion, Helmholz emphasises the importance of making a bacteriological examination of every case of pyelitis before a cure is pronounced, and of referring to a urologist for a careful study of the urinary tract all the cases in which the condition does not clear up after an intensive course of treatment by methenamine.—Dr. Leslie Cole and Dr. C. H. Whittle contribute a paper on Congenital Obliteration of the Bile-ducts, with a description of two cases in infants aged 5 months and 8 weeks respectively, and an account of the post-mortem findings.—In a Note on Combined Congenital Ectodermal Defects Dr. F. Parkes Weber points out that during the last 50 years a great many congenital and often familial ectodermal defects have been studied, including congenital alopecia, congenital hypotrichosis, monilithrix, and hypoplasia pilorum moniliformis often associated with more or less keratosis pilaris, various forms of congenital aplasia or dystrophy of nails, congenital dental aplasia, congenital anhidrosis, congenital asteatosis, and familial epidermolysis bullosa. Various examples of the association of these defects are quoted from the literature, and an annotated bibliography is appended.—Dr. Walter R. Bett contributes an article entitled Some Pædiatric Eponyms: Pirquet's Reaction, which contains a translation of Pirquet's original description of the reaction published in 1907, and a sympathetic sketch of his career, illustrated by an excellent portrait with his autograph.—The abstracts from current literature are devoted to treatment.

INDIAN JOURNAL OF MEDICAL RESEARCH. Vol. XVII., No. 2, October, 1929.—This number comprises some 28 papers, of which it is possible to give only the shortest summaries. D. C. Wilson and V. E. Pilley, under the ægis of the Indian Research Fund Association, have studied osteomalacia in India.—R. N. Chopra and his collaborators continue their studies on Indian drugs, and contribute papers on the kut root (*Saussurea lappa*), the pharmacological action of pseudo-ephedrine from the Indian varieties of ephedra, and observations on certain medicinal plants used in indigenous medicine.—I. M. Puri describes the male, female, egg, and larva of *Anopheles annandalei*, var. *interruptus*, and *Anopheles sintoni*, a new tree-hole breeding species.—H. H. King, C. G. Pandit, K. P. Menon, and I. P. V. Seetharama have made a thorough house-to-house filariasis survey in Saidapet with a note of the source of filarial infection in mosquitoes, and have also worked out the development of the filaria of the lizard, *Corrispiculum guindiensis*, in *Culex fatigans*. Both these papers are of very great importance to those interested in filariasis.—R. McCarrison has made further studies on the production of lymphadenoid goitres in rats.—T. A. Hughes and his assistants contribute papers on the effect of bile-salts, serum calcium, and phosphorus in health and disease.—K. V. Krishnan has attempted to standardise the antigen used in the syphilis flocculation reaction.—S. R. Christophers has made a collection of the anopheline and culicine mosquitoes from Madeira and the Canary Islands and here describes them, and also writes on hæmolysis by acid and basic quinine salts.—M. B. Soparkar has found a case of bovine tuberculosis in man in India.—R. B. Lloyd and S. N. Paul have investigated the serum protein changes in malaria and typhoid fever, and suggest that they bear some relation to immunity.—L. A. P. Anderson, M. G. Coombes, and S. M. K. Mallick have studied the interesting dissociation of *Bacillus aviseptícus*. M. L. Ahuja has observed the electrical behaviour of rough and smooth variants of *B. typhosus*, and H. E. Shortt, R. O. A. Smith, H. A. H. d'Silva, and C. S. Swaminath have demonstrated *Leishmania donovani* in the fæces of a case of kala-azar.

MELKSHAM COTTAGE HOSPITAL.—Lord Radnor, Lord-Lieutenant of Wiltshire, last week opened an extension of this hospital which increases the number of beds to 31. The additions comprise a women's ward with nine beds, and a children's ward adjoining with eight cots. The opening coincided with the diamond jubilee of the foundation of the hospital.

THE LANCET.

LONDON: SATURDAY, JANUARY 25, 1930.

NOMENCLATURE OF RENAL DISEASE.

EXISTING classifications of Bright's disease are confusing and unsatisfactory, and it is not necessary to refer to text-books in order to make this discovery, because every medical man and, for that matter, every medical student is aware of the fact. There is, in fact, no branch of medicine in which dispute as to classification has been more active and unanimity more unobtainable. Terms such as chronic interstitial nephritis, parenchymatous nephritis, tubal nephritis, arterio-sclerotic kidney, and so forth, are employed in medical literature, but with different significations by different writers, and accessory labels, such as large white kidney, contracted kidney, granular kidney, and so on, are offered as alternatives or synonyms until the reader's mind is clouded. The magnificent attempt of BRIGHT to correlate his clinical discoveries with post-mortem observations yielded results which for a time increased the general knowledge concerning diseases of the kidney, but it has long become apparent that naked-eye morbid anatomy is insufficient as a guide to the pathological processes present. Modern histological research, particularly in Germany, under the auspices of ASCHOFF, VOLHARD and FAHR, and MÜLLER has, in recent years, opened up new avenues of investigation, and for many months advanced students of medical science in this country, amongst whom we include physicians of great experience and laboratory workers of established reputation, have awaited the publication summarising the work on nephritis which has been carried out during a long period in the Institute of Pathology at the London Hospital by Prof. TURNBULL and his assistants. This has now emerged in the form of a report by Dr. DOROTHY S. RUSSELL, a brief summary of which appears on p. 204.

Dr. RUSSELL'S proposed classification represents an advance beyond the generality of orthodox teaching, and it is certain that the majority of serious writers in this field, whether in Great Britain, France, the United States, or Germany, will agree that it is closely in harmony with the views which they have individually expressed during the past decade. In the first place, she recognises a purely ischæmic group of renal degenerations, entirely separate both in its pathological and its clinical manifestations from the inflammatory group proper. It is the group to which GULL and SUTTON originally drew attention, and Dr. RUSSELL'S work confirms the views of those who have maintained that, conspicuous as are the changes seen in the kidneys of such patients in the post-mortem room, they rarely present themselves clinically as obvious cases of renal disease, since the renal function is seldom sufficiently affected for the production of uræmia and its preceding symptoms unless a true toxic nephritis is superimposed upon the condition. In an introductory chapter Dr. RUSSELL points out that this group cannot properly be included in the term "nephritis" or "Bright's disease," and then immediately proceeds to do so. Nor is it easy to see how she could have done otherwise, particularly as the average clinician has for years unconsciously confused this group with the more chronic forms of true renal inflammation. Having dealt with this important group, Dr. RUSSELL proceeds to place all the true inflammations under the heading of "toxic nephritis," subdividing this into mild nephritis ("nephritis mitis") and intense nephritis ("nephritis acris"). The first of these divisions is admittedly nothing more nor less than the group which, under the name of "nephrosis," has caused vigorous controversy in all countries during the last ten years. As far as can be ascertained from a perusal of the report, the pathological department of the London Hospital has now given wholehearted adhesion to the contentions of EPSTEIN and of the modern German school. In view of the recent criticisms by H. GAINSBOROUGH[1] and H. A. CHRISTIAN,[2] this is a very significant fact; but it leaves the student in some perplexity as to why the term nephrosis, which has had the merit of provoking thought, has been abandoned in favour of a Latin word of somewhat vague significance. In the group "nephritis acris" is included the welter of cases in which active inflammation of the kidney is seen in all its early and late manifestations. "Nephritis repens" is regarded by Dr. RUSSELL as a sub-group of nephritis acris, although she admits unfamiliarity with any of the early stages of inflammation leading up to the terminal condition of advanced renal inflammation of sclerotic and degenerative character which distinguishes this group. The text hardly makes it sufficiently clear to the reader that this is, in her opinion, a sub-group rather than a main category.

It is not in any way to belittle the importance of this work if we suggest that the difficulties are stated and helpfully discussed rather than solved. In spite of the amount of skilful labour that has been devoted to the compilation of the report, it is clear that it contains much controversial and some hypothetical matter. While proper stress is laid on certain biochemical tests and the deductions to be drawn from them, little or no reference is made to the important advances in biochemistry dealing with the composition of the body fluids, which have recently thrown so much light on the significance of œdema in various types of Bright's disease. The omission is perhaps a wise one. But we cannot help fearing that in evolving a classification of nephritis in harmony with the opinions of the majority of advanced workers in all countries to-day, Dr. RUSSELL has imperilled the utility of her admirable investigations by proposing three new descriptive terms. It is given to few to recast the currency of a common topic and, unless these terms receive wide and early adoption, the unfortunate student will be plunged still more deeply into the bog of confusing nomenclature. This does not impair the value of the report as a classical study of the histology of Bright's disease.

MENTALITY AND ANÆSTHESIA.

IT happens not seldom in the practice of medicine that some of the more vague and ill-defined factors in a case may yet be those of the greatest importance. We reckon among the ill-defined factors in an ordinary surgical patient all those attributes which may be included under the term "mental make-up," and it is interesting to see how striking a part these attributes may play in determining the behaviour of the patient under anæsthetics; interesting, and yet, it seems, not enough attended to. In a contribution to the current number of the *British Journal of Anæsthesia* Dr. DUDLEY BUXTON deals partly with this aspect of the practice of anæsthetics, and calls

[1] Quart. Jour. Med., 1929, xxiii., 101.
[2] THE LANCET, 1929, ii., 340.

to mind how the rôle played by the mental state of the patient may affect response to the selected drug. But his excellent dissertation is more closely concerned with the connexion between physical qualities in the patient and the production of anæsthesia. Every practising anæsthetist is aware of the striking difference displayed by different patients in their reaction to anæsthetic drugs; he does not always realise, however, how largely that difference is an affair of the psychological, rather than the physical state of the subject. The teacher of anæsthetics is accustomed to point out to the students under his instruction the discrepancies between the way in which the typical heavy physical worker—the coal-heaver, for example—reacts to an inhaled anæsthetic, and the reaction displayed by an underfed shop assistant. Dr. BUXTON points out, similarly, the contrast between the behaviour of the thick-necked, red-faced, muscular subject and the thin pale female when submitted to anæsthesia. But while he is careful to accentuate the many differences in behaviour under anæsthetics occasioned by differences in physique, he is, we think, not so anxious to bring to mind the very extraordinary differences in conduct which are entirely dependent on psychological differences in patients.

Now, to our thinking, this source of difference in behaviour is often more important and more influential than any produced by the variations in physical attributes. It is, for one thing, doubly important because of its very lack of obviousness. All the precautions necessary are likely to be taken to counteract undesirable results that may arise when the causes of the possibility or probability of these results are plain. When there is no such clear indication, then the precautions may be neglected, and the unwished-for phenomena, when they arise, may be difficult to cope with. There are, for example, people who give no indication by their behaviour at the start of inhalation, or by their manner generally, that they will show any peculiarity with regard to the effect of anæsthetics. They are, also, apparently of ordinary physique. Yet very early in the course of the induction of anæsthesia they are seized—it may be suddenly seized by such violent mental excitement, resulting in extreme precipitate muscular action, that they may hurl themselves from the operating table before any attempt at control can be made. Fortunately, examples of this peculiarity in its severest form are unusual. But they are not too rare for every anæsthetist of experience to have encountered them once and again. The explanation of this unexpected, uncontrollable, and unconscious activity of the voluntary muscular system is in all probability to be found in impulses arising from the cells of the lower layers of the cerebral cortex, the presumed seat of the "unconscious mind." And the impulses arising from this site are due to impressions placed there by previously received stimuli, these stimuli having been received generally during consciousness. This hypothesis at any rate offers a simple explanation for the familiar fact that the kind of phenomena we are considering here were unusually common among men who had endured the horrors of prolonged trench warfare and the stress and emotion called forth on the battlefield; these being subsequently repressed in ordinary life had so stamped themselves on the brain that the moment conscious control was withdrawn they took command. The officer who had led his men over the top leaped from the dentist's chair to do the same again, and the private soldier, who had saved his own life by dealing another a death-thrust with the bayonet, hurled the attendant nurse away from the table by which she stood while he became unconscious. These violent exhibitions which occur after the patient has lost consciousness may be regarded as the outcome of a kind of dream, and the relationship is well recognised between dreams, the hallucinations of unstable minds, and the mental states which occur in association with anæsthetic drugs.

It is of the first practical importance that the mental aspects of anæsthesia should be fully recognised, and that every step should be taken to ensure that the experience leaves no unpleasant, certainly no terrifying, impression. This is of particular importance with children, for, wrongly managed, the administration of anæsthetics may plant in a child's mind a fear which throws a shadow over his whole life, and which will certainly render any subsequent entrance to anæsthesia, should one become necessary, dreadful to the patient if not really dangerous.

MEDICINES IN THE MASS.

IT is recorded that one, SAMUEL JESSOP, who died at the age of 65, in the year 1817, had such an inordinate craving for physic that in 21 years he took no less than 226,934 pills, besides 40,000 bottles of mixture; and in 1814, when his appetite increased, his consumption of pills was 51,590. "Truly," says WILLIAM WARD, in whose quaint memoirs we find this remarkable story, "he must have thought with the prophet, 'The Lord hath created medicines out of the earth, and he that is wise will not abhor them.'" In the absence of evidence to the contrary it may be assumed that the late Mr. JESSOP holds the record as a pill swallower, but there were others who ran him pretty close as, for instance, DAVID HARTLEY, who ate 200 lb. weight of soap, and a certain bishop who drank a butt of tar water. From all this it seems clear that the Englishman's fondness for medicines is no new thing, but rather is a tradition that has been handed down from father to son. And so, as STEELE observed, there arise in one generation after another quacks and those that are their prey. More than 100 years ago England was called the "paradise of quacks," and the title still has its claim. In the nature of things there is, of course, a difference between the nostrum monger of to-day and his prototype of old, for this is an age of mass production, while the other was an age when output was limited to the capacity of a man's hand. But in spite of, or because of, mass education, the credulity of the public is unchanged and unchanging. There is probably as much money spent on teaching the people that quack medicines are good for them as on any other single purpose, and so long as the nostrum industry is allowed to say what it likes, and the newspaper industry is allowed to print what is said, quackery will continue to flourish.

It is a deplorable fact that public opinion is not against secret remedies; but so much money is being spent on educating the public to believe in them, that the public intelligence is perverted. We have made some progress, it is true, to arrest the evil. For instance, no Government in our time has engaged in the quack medicine business; this is a step forward, for in times past governments have paid large sums for the purchase of nostrums. Thus in 1739, the House of Commons voted £5000 to JOANNA STEVENS for a solvent to remove stone, notwithstanding which, said a writer 90 years later, "there have been as many human calculi, since formed by His Majesty's liege lithotomical subjects, as would macadamise one

side of Lincoln's Inn Fields." Incidentally, it was DAVID HARTLEY, the soap fiend, who was instrumental in obtaining this grant for Mrs. STEVENS, and it is sad to reflect that he himself died of the stone. The Parliament of England went out of the quack medicine business many years ago, and the moral outlook has been improved to that extent; but it is humiliating to have to admit that beyond ceasing to encourage quackery no Government in this country has done anything to discourage our Jessops or to protect medicine-taking dupes from medicine-making pretenders. Let us make our position quite clear. We do not condemn proprietary medicines en bloc, while we deplore the license enjoyed by the vendors of worthless remedies. Here we feel it to be our duty to point to the need which exists for some restraint on the zeal of those engaged in the traffic. Just before the war there was a Bill before Parliament which aimed at the prevention of some of the abuses which are part and parcel of this unwholesome business, and there were good prospects of the measure passing into law, notwithstanding the several vested interests which it affected. The Bill was based upon the recommendations of a Royal Commission (published as a supplement to THE LANCET, Jan. 10th, 1925), and by its main provisions it sought to prevent the sale and advertisement of "cures" for incurable diseases, and to prohibit the making of unjust claims as to what a secret remedy could do. It attacked only the obviously fraudulent side of the industry, and left open for exploitation by drug makers, enthusiastic for their own preparations—an even wider field than is available for cultivation in any other civilised country. We would that the present Government, despite its obvious lack of time in which to meet its commitments, would take this Bill out of its pigeon-hole and at least give it an airing. No honest man would stand to lose anything if it became law, and no hypochondriac would be stinted unduly in the practice of his hobby. The secret remedy evil is rapidly increasing in this country because ours is the only nation which does nothing to check it. Profits are being made among us by aliens through methods which if employed in the land of their birth would render them liable to segregation as enemies to society. This is a preposterous state of affairs. Mass production, big newspaper circulations, and ever-widening of the channels of distribution are continuing to spread the evil to such an extent that it may soon become a national vested interest, and as such be almost impossible to destroy. Our staple industries are in a bad way, unemployment and shortage of money are acute; and yet the turnover of quack medicines is bigger than ever it was, and many people are spending on rubbish what they ought to be spending on food. Our administrators should look into this matter; the spade work has already been done, and, as we have said, the appropriate Minister will find waiting in his Department a considered measure which if passed into law would afford some protection for the ignorant and quell an abuse which humiliates this country in the eyes of the world.

We do not think that pharmacists as a class would oppose the desired legislation, notwithstanding that it is through their hands that proprietary articles and secret remedies are passed to the ultimate consumer. In a recent statement, which has been accorded wide publicity, the President of the Pharmaceutical Society advised chemists to set their faces against the sale of drugs through automatic machines. There are obvious reasons why such a method of distribution should be condemned, and one of the reasons stressed by the President was that the employment of automatic machines by chemists detracts from "the personal value of their services to the public." This is true enough, and it is none the less true that a pharmacist who sells to the public a ready-made packet of a compounded drug of whose ingredients he is kept in ignorance by the manufacturer is also doing something which detracts from the personal value of his services. In the one case it is the pharmacist who employs an automatic machine and in the other it is the proprietor of the advertised nostrum who employs the machine; in the one case the machine is made of wood or metal and in the other case the machine is an educated human being. What personal service does the pharmacist render to the public when he hands over to a purchaser a box of pills he knows nothing about? Quite obviously he is rendering a disservice if he knows that the pills cannot possibly do what the advertisements claim for them. We regard the pronouncement of Mr. MORETON-PARRY valuable both in the interest of pharmaceutical chemists and the public; carried to its logical conclusion this statement must have a wide influence on the distribution side of the secret remedy industry. The time may come, and we hope it is not far distant, when British pharmacists will come into line with their Dutch confrères. As was recorded in our last issue (p. 168), at the instigation of the chemists in Holland a commission has been framed for the purpose of controlling the advertisements of medicinal preparations. This is highly commendable on the part of the Dutch chemists, and we hope that the President of the Pharmaceutical Society will carry his campaign against the automatic distribution of drugs a step further by advising action by the members of the Society, over which he presides so judiciously, on the lines of the Dutch programme.

Annotations.

"Ne quid nimis."

VITAL STATISTICS FOR 1929.

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infantile mortality during the year 1929.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales ..	16·3	13·4	74
107 county boroughs and great towns, including London ..	16·7	13·8	79
157 smaller towns ..	16·0	12·3	69
London	15·9	13·9	70

The smaller towns are those with a population in 1921 of 20,000–50,000. The death-rate for England and Wales (which is based on the estimated population for 1929) relates to the whole population, but that for London and the two groups of towns (based on the 1928 estimate) to the civil population only. Birth-rate and death-rate are per 1000 population, infant mortality-rate per 1000 live births.

The Registrar-General remarks that the birth-rate is 0·4 per 1000 below that of 1928 and is the lowest recorded. The death-rate is 1·7 per 1000 above that of 1928, a rise practically confined to the first quarter of the year, and due to the epidemic of influenza in the spring and the severe weather in that period. The infant mortality-rate has increased from 65 to 74 per 1000 live births, a rise probably due to the same causes. These provisional figures, which are not likely to require substantial modification, have been issued for the information of medical officers of health.

AN AUSTRIAN THAUMATURGIST.

OUR Vienna correspondent tells us of the widespread fame as a wonder-healer achieved by a man named Valentin Zeileis in the small village of Gallspach in Upper Austria. Zeileis, who is now 56 years old, is a former peasant who has been experimenting with electricity from his boyhood, and has for 20 years past had wide vogue among his brother peasants. Now hundreds, even thousands, of patients are flocking daily to his office, where they have to disrobe *coram publico* and are seen by the "doctor" (as he is called) simultaneously in groups of 10 to 15. The great man uses a "diagnostic rod," being a glass tube containing radium emanation through which is passed a powerful high-frequency current. This rod or wand is moved over the body of the patient until it becomes fluorescent over any diseased or abnormal part. There is no doubt about the fluorescence, for the patient can see it, but its provenance is obscure to everyone but Zeileis himself. The treatment is then ordered. This consists chiefly of electro-static, high-frequency current, or hard X rays applied several times within a minute or two, or some combination of these with radium. The course of treatment lasts for 10 days or a fortnight, sometimes longer, when, our correspondent is assured, many patients who have already suffered at the hands of their own medical men return home relieved of their troubles. The place is in fact a veritable Lourdes, which it resembles in the nature of the diseases cured, which are mainly of a neurotic type with a sprinkling of rheumatic and pseudo-paralytic affections. Naturally all sorts of other sufferers, medical and surgical, come to seek Zeileis's advice, and he is shrewd enough to recognise where suggestive treatment will be useless or harmful, sending some away and sending others to medical men who believe in him, or at least affect to do so. Ethically the situation is interesting, for Zeileis's eldest son, who is working with him, has obtained the degree of M.D. in Austria, which, our correspondent says, makes it impossible to charge the father with quackery, as has been done on several previous occasions. When these cases came before the Court, numbers of staunch believers, of cured patients, and even of medical men, supported Zeileis's claims, with the result that he has remained unmolested since. He charges no fee for his services, but is always offered a trifle. Lately, in response to vehement attacks from the medical side, he has publicly disclosed the nature and technique of his electrical treatment, as briefly outlined here, and no doubt his experiments will be repeated in other quarters. It seems to be admitted that he and his assistants have had good results in some grave cases. In the last stage of this remarkable story Zeileis and his son have built an enormous institute in Gallspach, fitted up on the most up-to-date lines, in which 6000 patients can be treated a day. Here not only electrical but also other kinds of physical and hydrological treatment are given. Our correspondent remarks, in conclusion, that the flocking of ill persons to such centres is an indication that current medical knowledge does not (in Austria) completely satisfy the needs of suffering mankind.

REMEDIES FOR SEA-SICKNESS.

FOR sea-sickness Dr. Karl Muley,[1] of Istambol (Constantinople), gives good reports of a preparation called "otreon" (Höchst), recommended as an antacid. The tablets contain carbonates of bismuth and of magnesia, with 1 per cent. of papaverine and a foam-producing element, and Dr. Muley has found that they relieve nausea ashore. Thinking that the discomfort of sea-sickness is due to the dragging of viscera on the nerves of the diaphragm or peritoneum it seemed to him likely that papaverine would dull the afferent impulses from that region and so allay the vomiting, while the foam produced would distend the stomach and ensure that the papaverine made contact with the whole surface of the mucous membrane. The tablets, two of them, are to be taken with or without water, and swallowed whole. Relief has come in most of his nine cases within half an hour. It may be noted in passing that one of the literary magazines for November of last year recommends two forms of treatment for sea-sickness—one of them ginger-beer and the other antacid drugs. Their virtues are perhaps combined in this of Dr. Muley's. Possibly gas in the stomach may help to prevent the viscera from moving separately. Tight belts are often worn with this object.

Atropine as a vago-depressor has been in vogue for sea-sickness since 1913, and has proved of undoubted value. J. Bohec,[2] surgeon on the trans-Atlantic liner *Ile-de-France*, states that until last year he used atropine sulphate, but found it to have certain disadvantages. Its action is brief owing to rapid elimination, and the danger of poisoning makes it an unsuitable remedy for self-administration. In some cases the depressor action on the vagus is associated with a stimulation of the medulla, and hence of the vomiting centre; this type of case has been found to respond to atropine and morphia administered together. In 1927 Fischer suggested the use of lævorotary hyoscyamine, with scopolamine and mandragora; with these drugs the vago-inhibition of the hyoscyamine is augmented by the scopolamine, while the stimulation of the medulla due to the hyoscyamine is opposed by the depressor action of scopolamine on this centre. Bohec, working on the same principle, now employs a preparation of all the alkaloids of belladonna in the pure state, called "bellafoline;" this contains hyoscyamine, scopolamine, choline, asparagine, chrysatropic acid, and other alkaloids. The action is twice as marked and twice as long in duration as that of atropine, hence the dosage is smaller and safer; the toxicity is equal to that of atropine. Bellafoline can also be used in combination with a narcotic having a central action such as gardenal, and Bohec has made use of a preparation of this kind known as "belladenal." Bellafoline is taken before embarkation and during the early days of the voyage, and subsequently a tablet can be taken when the traveller feels an attack to be imminent. In the case of acute sea-sickness without employment of previous preventive measures it is stated that bellafoline has been given hypodermically with good results.

[1] Arch. f. Schiffs- u. Trop.-Hyg., November, 1929, p. 610.

THE CHICAGO WORK ON INFLUENZA.

Prof. Falk and his colleagues have now made a preliminary report[3] on their work on influenza. The investigation consisted in the bacteriological examination of the blood and upper air-passages of patients and the experimental infection of monkeys, with subsequent cultural examination of these animals and further serological work. During the height of an epidemic in Chicago 1928–29 16 rhesus and capuchin monkeys were sprayed with material from eight human cases of influenza or from monkeys infected from them. Many cultures were made and examined from human patients. Twenty-eight monkeys were given a disease "closely resembling influenza" by spraying the nose and throat with 12 cultures of the presumed causal organism obtained from the blood of patients or by exposing them to contact with infected animals. The proportion of successful results with the two methods is not stated. Mild clinical influenza was produced in three rhesus monkeys caged with one which had been infected by spraying. Some evidence of antibodies to the cultures used was also "very commonly" obtained in the blood of 50 persons shortly after the epidemic. The cultures to which most ætiological importance was attached consisted of an organism belonging to a group of streptococci which was isolated 48 times from man or experimentally infected monkeys. These organisms which the authors

[2] Presse Méd., Jan. 4th, 1930, p. 21.

[3] Falk, I. S., Harrison, R. W., McKinney, R. A., and Stuppy, G. W.: Jour. Amer. Med. Assoc., Dec. 28th, 1929, p. 2030.

call Group I. were characterised as highly pleomorphic, green-producing streptococci, which vary in their Gram-staining and fermentative properties, are not bile-soluble and are facultative anaerobes. These were not found normally in the blood or respiratory tract of monkeys. The streptococcus they consider similar to or identical with an organism described in an investigation of influenza in 1918–19 and more recent outbreaks. Other cultures, especially a group called Ia, appeared to have some relation to infections in man and animals, but were not so definitely associated with influenza.

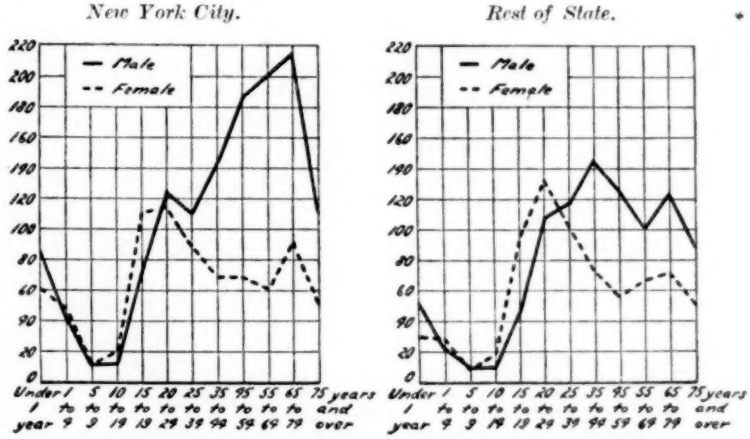
Making all allowances for the great bacteriological difficulties presented by the streptococcus group it does not seem certain from the evidence available that a definite streptococcus had a common primary ætiological relation to the cases of human influenza. There remain a number of points which need clearing up before it can be said that an epidemic of influenza was due to a well-defined species of streptococcus. The possibility that the initial infection was due to a virus does not appear to have been excluded, though such an infection is widely held to be the essential cause of influenza. That complications and pathological changes occurring in influenza epidemics are often due to infections with streptococci which invade a large number of closely associated cases is generally accepted, though attempts to establish this view have not often been so vigorously carried out and supported by experiments on monkeys. As was indicated in our annotation of Dec. 21st, 1929 (p. 1321), there are many difficulties in the way of accepting the work of Prof. Falk and his colleagues as having solved the whole problem of the ætiology of influenza. It is only fair, however, to add that such wide claims as were made in the lay press do not appear in the preliminary report. A full account of the investigation is promised shortly.

VITAL STATISTICS OF NEW YORK CITY.

THE records of life and death of the State of New York have become among the most important in the world, and the 49th annual report of the State Department of Health, dealing with experience in the year 1928, is an important volume, not only for the State itself, but as enabling comparisons with countries in the Old World to be made. We say, advisedly, comparisons with other countries, for the sovereign State of New York has a population of over 11½ millions. It is by far the most populous of the States of the Union. Of this population six millions live in the city of New York, the remainder in the many large towns and counties of the rest of the State. Both Dr. Matthias Nicoll, the State Commissioner of Health, and Dr. J. V. De Porte, the director of the division of Vital Statistics, can be congratulated on the increasing value of this report, and on the efforts being made to secure complete accuracy. In the past it has been difficult to be sure that comparisons between different towns and between rural and urban districts of the State were trustworthy, owing to the absence of a complete relegation of all deaths in outside institutions to the administrative districts in which the deceased had resided. Now tables are given enabling one to correct records by resident rates from all causes, for tuberculosis, cancer, and automobile accidents. A distinctive method is adopted for automobile accidents, which are corrected for place of occurrence of the accident. The allocation secured in these instances gets rid of a serious source of fallacy, while the second even more important source of fallacy, that of differing age-distribution of population, can be checked by the death-rates given in the report for separate age-groups. The importance of the correction is well seen in the statistics of tuberculosis. By allocation of deaths according to residence, the tuberculosis death-rate of New York City is increased by 11 per cent., and that of the rest of the State is reduced by 13 per cent. Similar allocation changes the fictitiously high death-rate of rural districts, which, instead of being 26 per cent. higher, become 35 per cent. lower than the urban rate.

The difficulties must be very great, but we hope that it may soon become practicable to give for all the areas within the State a complete allocation of death, which will make the report even more valuable than at present, as a means of comparison, and as a stimulus to investigation and reform in the areas with less favourable statistics. Against diphtheria the State organisation has done remarkable work in the immunisation of young children. These efforts have been eminently successful in reducing diphtheria in the districts in which the campaign has secured widespread immunisation; but so far as the experience of the State as a whole is concerned, it may be noted that in 1928 the death-rate from diphtheria was 107 in New York City, and 39 in the rest of the State, as compared with 81 in England and Wales. The comparison thus made is, however, unfair to New York State, unless we bear in mind that over a series of years diphtheria is several times heavier as a cause of death in continental than it is in insular countries. Probably, therefore, the results just quoted imply that New York State is already reaping some of the good results attainable from its admirable work for immunisation of children.

One further point may be extracted from the report out of the many which deserve study. It illustrates a point already under investigation both in this country and in the States—namely, the excess of death-rate from tuberculosis in girls over boys at ages 1–4, 5–9, 10–14, and 15–19. At all other ages, after the age of 20 has been reached, the tuberculosis death-rate in both countries is markedly higher in males than in females. The accompanying graphs taken from p. 40 of the report, show the differences between the two sexes at each age-period separately for New York and for the rest of the State. It will be noted that the excess of female tuberculosis begins at the pre-school age and continues right up to the age of 20. It is not explicable, therefore, solely by the greater amount of industrial and office work of girls in recent years. This, indeed, would scarcely explain it, as lads are subjected to similar conditions. The greater amount of outdoor life of boys may partially explain the difference; but



Death-rates per 100,000 from tuberculosis (all forms) in 1928.

it must be accepted that hitherto the position and its explanation are obscure. Note may be made of the markedly greater excess of male over female tuberculosis in New York City over the rest of the State. This doubtless corresponds in some measure with facts, but one would like to be assured that, in calculating the data for the above curves, prior allocation of deaths to place of residence had been made.

VACCINATION UNDER THE NEW ACT.

THE Local Government Act of 1929 did not alter the existing law relating to vaccination in any material respect and it will be the duty of the new authorities to continue on the lines laid down by the Vaccination Acts of 1867 to 1907. For their convenience the Ministry of Health has issued a short statement of the main statutory provisions governing this service in the form of a Memorandum (L.G.A. 33). Every county or borough council is required to divide its area into vaccination districts and to enter into a contract with a duly registered medical practitioner to act as public vaccinator for each such district. In most cases the poor-law institution of the area has been constituted a vaccination district by the guardians, its medical officer being under the same obligation as the public vaccinator. The obligations of the medical officer of an institution however differ somewhat from those of the district public vaccinator; he is required, for example, to vaccinate every child resident in the institution as soon as practicable after being requested to do so by the parent or guardian, and to offer vaccination in the case of any resident child who has reached the age of two months without having been vaccinated. Apart from the appointment of public vaccinators it will be the council's duty also to appoint one or more vaccination officers to enforce the provisions of the Vaccination Acts, the area of each such officer to coincide with one or more districts of registrars of births and deaths. Briefly stated, the duties of the vaccination officer are to act as registrar for vaccination in his district, and to see that all children resident therein are duly accounted for as regards vaccination. He issues the prescribed notice to parents, visits the homes of children who have not been vaccinated by the time they reach the age of four months, transmits to the public vaccinators the names and addresses of such children, and where necessary institutes legal proceedings for enforcing the law. The Memorandum suggests that until the council has gained experience of its own it will be convenient to maintain the present vaccination districts and to make contracts with the present public vaccinators on the prevailing terms. It is, however, a fact that the conditions of service of public vaccinators are governed by contract determinable by notice, whereas vaccination officers, being officers of poor-law authorities, their appointments can only be determined with the consent of the Minister of Health.

"BURDETT."

THE Year-Book of Philanthropy founded by the late Sir Henry Burdett has entered on its fortieth year.[1] During that time it has been a useful and trustworthy guide to the hospitals and asylums of Great Britain and Ireland, to institutions for rest and convalescence, and to all the agencies which assist the poor and helpless. As time has gone by it has become increasingly complete and latterly no little ingenuity on the part of the reviewer has been required to find a lacuna or inaccuracy in a new edition as it appears. The Year-Book may probably be regarded as the most lasting of Burdett's many services to the voluntary hospital movement. The present issue is prefaced by a review of current topics and problems from the pen of Capt. J. E. Stone, who notes the significance of contributory schemes and of the unification of hospital and medical services under the Local Government Act of last year. A hospital manager mentioned in the foreword remarked that his hospital was becoming "no longer a charity," and it is no doubt the outcome of this tendency which has determined the publishers of "Burdett" to discontinue the issue of the year-book in its present form. They accordingly approached the Joint Red Cross Council and the British Hospitals Association in order to see whether it would not be possible by coöperation to produce a wider and more comprehensive survey of the hospital world; and this has been agreed. The mere number of patients treated, the amount of money raised and spent, the numbers of hospitals and of their beds, give only a meagre indication of what goes on in the life of hospitals. Each year new buildings are planned, erected, and opened; new departments are found necessary; developments take place in personnel and equipment; discoveries are made that may lead to the cure or relief of the suffering. To record all this, year by year, will be the aim of those responsible for the projected year-book. To build it up will require time, effort, patience and the ready help of all concerned in the treatment of the sick. What the format of the new publication is to be has not yet been decided. It will, however, be issued at as low a price as possible.

THE ZONDEK-ASCHHEIM TEST.

THE results of the use of a modification of this test, reported on p. 183, are less satisfactory than those previously recorded in our columns.[1] Especially disappointing is the large percentage of error (27·9 per cent.) noted by Mr. J. H. Hannan in cases of diseased women with amenorrhœa. The fact that Mr. Hannan used not mice but rats, in which animals spontaneous luteinisation may occur, and that he did not confirm his findings by microscopy, may have significance. In Germany the test is being investigated in many centres and the results published a few weeks ago by Prof. G. A. Wagner[2] are a compilation of those obtained up to the present in a number of important women's clinics in that country. The results are in good general agreement with those of Allan and Dickens. In Prof. Wagner's own clinic, the Charité in Berlin, the originators of the test have investigated in all nearly 1000 cases, using about 11,000 infantile mice. They now place the accuracy of the test, based upon this large number of specimens, at 98·8 per cent. Other German workers give the figure as about 98 per cent. A total number of about 1600 cases have now been studied in the clinics at Berlin, Düsseldorf, Freiburg, Göttingen, Greifswald, Cologne, Kiel, Marburg, Münster, Stuttgart, Tübingen, and Würzburg. The reaction has therefore received an extensive trial, in the course of which several conditions have been recognised in which errors may arise. It seems clear that the reaction is dependent in some way upon the presence of the placenta and the intactness of the connexion between maternal and fœtal elements. The test gives a positive result only in apes and in man; in the pregnancy of lower animals where the placentation is less elaborate the test is negative. Several workers emphasise the fact that negative results are obtained after the death of the fœtus, and the placental nature of the test is shown by the fact that cases of chorion-epitheliomata are reported as strongly positive. Even 48 hours after delivery the test is negative (Allan and Dickens), and this shows the rapidity with which the excess of the hormone is eliminated after the loss of the placenta. Cases of hydatidiform mole also gave a positive result in the hands of observers abroad, though Mr. Hannan was unable to confirm this finding. Dr. Kriele, of Berlin-Neukölln, had a negative result in a case of pituitary tumour, coinciding with the

[1] Burdett's Hospitals and Charities, 1930, being the Year-Book of Philanthropy and the Hospital Annual. Fortieth Year. London: Nursing Mirror, Ltd., 1930. pp. 957. £1 1s.

[1] Allan, H., and Dickens, F.: THE LANCET, Jan. 4th, p. 39.
[2] Deutsche med. Woch., Dec. 20th, 1929, p. 2125.

experience of Allan and Dickens. A somewhat disturbing result is a positive test in a woman at the menopause, other menopausal cases giving negative results. Exceptions of this kind may be a source of grave inconvenience, and Prof. Baisch, of Stuttgart, referring, as do other workers, to the drawbacks inherent in the use of experimental animals for diagnosis, suggests that when a chemical test for the hormone is arrived at and the present roundabout method of detection is avoided, the test will undoubtedly be very generally used. As yet, however, no known chemical tests are characteristic of the presence of the hormone. The bromine test briefly described by Dr. C. Voge, of Edinburgh, may possibly fall into this category; at present there is little evidence to support its claims. A specific chemical test for the hormone would undoubtedly increase the application of this valuable reaction, but it may be difficult to find. Specific chemical tests for substances such as insulin or pituitrin are still wanting.

MODERN METHODS OF REFUSE DISPOSAL.

DISPOSAL of refuse, as Mr. J. C. Dawes remarked in a paper read to the Society of Medical Officers of Health on Jan. 17th, was a problem in the Mosaic period, and has been a trouble ever since. At present, the methods of solving it are six: by dumping, controlled dumping, separation, incineration, pulverisation, and dumping into the sea. The first and the last have little to recommend them, but the intermediate methods, if properly employed, are reasonably good. In choosing a method three principles are to be observed: that the method should be sanitary, that it should be completed in one operation, and that it should cost as little as is compatible with the success of the two foregoing conditions. Indiscriminate dumping leads to annoyance by flies, rats, and crickets, and by offensive odours, especially when the dump is on fire. Controlled dumping, however, can be extremely successful, and the city of Bradford offers a brilliant example of the value of this method. The tipped refuse can be used to fill unsightly quarries, or to raise and level fields, and is generally laid down in terraces six feet in depth if the dumping ground is sloping. The tipped refuse should be covered within 72 hours by some incombustible material, and the tipping-face should not be more than 25 feet wide. At Bradford 200 tons of refuse are dumped daily, and the tip is complete and covered by five o'clock each day. The tipping-face is 21 feet wide, and hence an area of 21 feet by 6 is the only part of the dump uncovered during the tipping period. Combustion has never occurred from this method, since the covering material excludes the air supply; the flies and crickets cannot approach the refuse, and rats cannot occupy holes in the dump owing to the compression of the materials, and the absence of voids and half-empty containers. On the other hand the conditions favour the multiplication of anærobic organisms, which destroy the putrescible contents of the refuse and gradually render it innocuous. This method is chiefly valuable where there is land to spare for dumping, and where a good covering material can be easily and cheaply obtained; at Bradford road-sweepings make a large part of the covering material, and the dump is quickly grassed over owing to its fertility. Where this method cannot be employed, owing either to lack of available space or suitable covering material, incineration in a modern plant is a convenient method of refuse destruction. In the Blackpool plant the daily supply of refuse can be destroyed at one operation; the process includes sifting out of dust, removal of metals by a highly magnetised field, and, finally, combustion of the tailings; since these contain little dust the smoke production is reduced to a minimum.

Dr. Charles Porter spoke of the need for legislation which should insist on adequate and accessible domiciliary arrangements for the storage of refuse. Districts in central London have great difficulty in the disposal of their refuse; one method employed is to hand it over to a contractor, who often dumps it indiscriminately on some piece of land in the neighbourhood of London, to the annoyance of the whole adjacent district. Reorganisation is essential in these cases. An efficient service can do much, not only to improve the methods, but to reduce the costs. Mr. A. E. Kennedy, speaking on this point, emphasised the importance of expert control; workmen, lacking a theoretical understanding of their occupation, cannot be expected to perform it efficiently without continual supervision. Dr. John Tate, of Middlesex, spoke of the difficulty of rubbish disposal in poor districts where no suitable covering material is available; the soil in Middlesex, being largely clay, is useless for the purpose. Other methods of covering have been suggested, such as that employed by Dr. D. H. Geffen, of Enfield, who makes the tip very narrow and covers the refuse with sleepers, over which the heavy vehicles containing refuse pass to the tip. While this method has the additional advantage of compressing the dump, there is some evidence that it does not exclude either fly-breeding or invasion by rats. If the controlled dump method can be put into practice for a year, however, the first dump will by that time have developed into suitable covering material, and the problem is thus permanently solved. The method is so free from annoyance that it is being employed at Bradford to build up the land round a local hospital, without any offence to the patients or staff. The material of the dump is of value to bricklayers, but if it is to be suitable for their purposes it must on no account be earth covered; covering material should be obtained from "dead" dumps. The question of salvage from refuse is a vexed one; rags are of value but should not be handled until they have been kept at a temperature of 140° C. for 40 minutes. This plan is followed with success in some plants. "Tins" consist of best soft iron with a tin coating, and should be rescued for girder making; bones are of value for glue, and 30 per cent. are wasted by incineration at present. The occupation of rubbish-picking, however, cannot be considered to be very desirable, and it is questionable whether it should be allowed to continue.

Much could doubtless be done to reorganise the refuse disposal service; in Cologne the refuse is never seen by the dustman, who removes it in a closed container. This method is also employed in Birmingham, where the corporation own a large number of containers—an example which might be followed with advantage elsewhere.

TEMPORARY COMMISSIONS IN THE R.A.M.C.

REVISED conditions under which temporary commissions will in future be granted in the Royal Army Medical Corps have now been approved by the War Office. An applicant must be a duly qualified medical practitioner, registered under the Medical Acts in force in Great Britain and Northern Ireland. Pay will be at pay warrant rates, as for an officer of his rank in the R.A.M.C., and allowances as for a regular officer will be issued. In addition, on conclusion of his temporary service a bonus of £100 will be paid for each completed year of satisfactory service. Approved candidates will be appointed in the rank of lieutenant. After three and a half years of temporary service officers will, if duly recommended, be promoted to the rank of captain with the appropriate rate of pay and allowances. A refund (up to £40) will be made of reasonable expenditure on articles of uniform which an approved candidate is specifically instructed by the War Office to obtain on appointment. If subsequently appointed to a permanent commission he will receive the difference between £50 and any sum already issued to him as outfit allowance. An officer appointed to a temporary commission under the above conditions will be eligible for selection for a permanent commission provided he is not over 28 years of age; in reckoning age for this purpose an officer will be allowed to deduct from his actual age

the period of such temporary service. Permanent commissions will normally be offered to temporary officers on or before the completion of 12 months of temporary service. Temporary officers who do not then accept a permanent commission will not be eligible, save in exceptional circumstances, for the grant of a permanent commission at a later date. An officer appointed to a permanent commission whilst serving as a temporary officer under the above conditions will not receive the bonus of £100 for each completed year of service, but he will be allowed to count such temporary service for increase of pay, promotion, and retirement. All particulars may be obtained by application to the Under Secretary of State, the War Office (A.M.D.1), Whitehall, London, S.W.1.

PASSIVE IMMUNITY IN CHICKEN-POX AND MEASLES.

In the case of measles passive immunisation by means of convalescent serum has passed from the experimental to the practical stage, as witness the scheme of prophylaxis lately recommended to boroughs by the Council of the Metropolitan Branch of the Society of Medical Officers of Health. It was inevitable that, sooner or later, the same procedure should be applied to other diseases of unknown ætiology, such as chicken-pox and mumps. The use of convalescent serum to secure a temporary protection against chicken-pox is said to have been tried first in 1923 by Blackfan, Peterson and Conroy,[1] and since then it has been studied in various quarters. The reasons for immunisation are not so urgent in chicken-pox as in measles, since it is not destructive to life and well-being. But, as J. E. Gordon and F. M. Meader,[2] point out, cross-infection with this disease is always upsetting the harmony of hospital management, because it requires three weeks' quarantine, and there is the "additional disagreeable criticism which follows contraction of a secondary infectious disease, even in the absence of culpability on the part of hospital personnel."

These writers submit some interesting evidence on the incubation period and the period of infectivity of chicken-pox. In 54 out of 67 cases in which the incubation period could be calculated with precision the eruption came out on the thirteenth to the seventeenth day, the commonest being the fifteenth, and in no instance did it appear on the generally accepted maximum of the twenty-first day. Two cases in their experience throw light on the infectivity of chicken-pox before the efflorescence of the eruption, and while one indicated that chicken-pox is not infectious 24 hours before the appearance of the rash, it appears from the other that the patient was infectious at least nine hours before vesicles were noted. Gordon and Meader consider that these features of chicken-pox have an important bearing on serum prophylaxis, because the long incubation period gives the antibodies a chance to catch up the slowly multiplying virus, while the parallelism between the first unmistakable sign of the disease and its infectivity make it possible to determine with some certainty the time of possible infection of susceptible contacts. Owing to the high infectivity of the prodromal stage of measles—a stage sometimes prolonged to five or six days—contacts may be infected some time before the infecting case is definitely recognised, and the benefit they will gain from convalescent serum is correspondingly reduced; since to produce complete protection against measles the serum should be given in the first five days of the incubation period. We doubt if this aspect of measles prevention work has been sufficiently recognised. Almost all the preliminary work has been done in hospitals where the early signs of the catarrhal stage are likely to be noted promptly, and now that the method is to be applied in the field of general practice, we must not be disappointed if the percentage of completely protected children is somewhat less high. Whatever importance is attributable to the factors mentioned, the success which Gordon and Meader report from using convalescent serum in prophylaxis against chicken-pox is encouraging, a protection rate of 91 per cent. being claimed among susceptibles. They got their best results by giving an intramuscular injection of 10 c.cm. of a pooled serum obtained from convalescent patients one to two months after the eruption. Serum obtained two to four months after the eruption was less reliable, whilst the protective value of serum withdrawn five to ten months after the onset was poor. To forestall the criticism that absence of infection is not always due to prophylactic measures, they have been careful to include in their observations 81 cases in which exposure took place but no serum was used. Fifty-five of these exposed susceptibles took chicken-pox, and it is on the basis of this proportion of infections that they have calculated their protection rates in the serum-injected patients. The serum being homologous, no objection can be raised on the ground of serum sickness or sensitisation of the patient. As with other forms of passive immunity, the duration of protection is relatively brief; apparently it does not last much beyond the longest incubation period, since of 12 injected patients re-exposed to secondary cases two contracted chicken-pox.

We are aware of several experiments in passive immunisation against chicken-pox having been carried out in this country, and it might be worth while to take these further. The current remedies for limiting ward outbreaks are the prompt isolation of cases and the quarantine of susceptibles, preferably in small groups. In view of the limited isolation accommodation in many of our fever and children's hospitals, the dispersal of a mass of contacts is often only a counsel of perfection, and whole wards have to be retained in quarantine for three or six weeks or even longer. In this way it is a recurrent experience to find as many as 10 per cent. of the available beds of a hospital in which the normal ebb and flow of admission and discharge is seriously interrupted. This can hardly be regarded as satisfactory, and it may well be that immunisation provides the best remedy.

[1] Ohio State Med. Jour., 1923, xix., 97.
[2] Jour. Amer. Med. Assoc., Dec. 28th, 1929, p. 2013.

MINOR LENTICULAR OPACITIES.

In Vol. XX. of the Westminster Hospital Reports Mr. A. F. MacCallan remarks that the slighter forms of cataract are much more common than is usually supposed and may be present even in persons with full visual acuity. It is, however, questionable whether in the interests of the peace of mind of our patients these slight forms of cataract, at any rate such as are non-progressive, ought ever to be termed cataract at all. The phrase "opacities of the lens" would be preferable. Mr. MacCallan describes several varieties of the condition, nearly all of which are in the lens cortex and therefore cannot have been present at birth, apart from certain rare forms of lamellar cataract developing earlier than usual in the layers now known as the "fœtal nucleus." All these forms of opacity, including the one just mentioned, presumably owe their origin to some variety of defective nutrition affecting the lens fibres which are being continually developed from fœtal life to old age. In the case of lamellar cataract we know that the defect in nutrition is one that is often associated with rickets and defective enamel of the incisor teeth. In the case of the cortical opacities of all degrees found in adult life, in Mr. MacCallan's opinion the cause in the majority of cases is a condition of chronic focal sepsis. The nutrition of the lens is derived by osmosis from the aqueous humour whose composition is dependent on that of the blood. There is experimental proof that certain poisons introduced into the blood can cause

cataract. In rabbits artificial cataract has been produced by feeding them on naphthalene. Mr. MacCallan's experience in Egypt proved to him that the poison of ankylostomiasis is capable of causing cataract. Diabetic cataract must be caused in a similar way. His belief is that in almost all cases of cataract, and also of those slight lens opacities which may be compatible with good vision, some focus of toxic absorption either has existed or does exist, and that it is our duty to seek for it in the teeth, nasal sinuses, or mucous membrane, tonsils, intestinal tract, or elsewhere. In a series of his own cases, while not all those with focal sepsis exhibited lenticular opacity, every one where this was present was found to have a condition of focal sepsis. Since, in another passage, Mr. MacCallan tells us that in two series of his own cases as many as 45 per cent. were shown, either with or without the slit-lamp, to exhibit some opacity of the lens, his figures may be thought to prove too much for his argument to have much weight, for the connexion of two such very common conditions as focal infection, past or present, and slight lenticular opacities is by no means necessarily one of cause and effect. (The percentage of 45 given by the author seems higher than his figures justify.) The particular condition of sepsis that is by far the most common is dental sepsis, and since it is rare to find anyone in middle life who has not at some period suffered from dental sepsis it is difficult to see how percentages in this connexion can prove anything at all. At the same time it must be admitted that there is considerable ground, prima facie, for attributing many forms of cataract to sepsis, a view for which Mr. MacCallan does not claim any originality. The presence of opaque striæ in the lens is due, as a rule, to the coagulation of the protein substance of which its fibres are composed, but incipient cases may be due to the presence either within or between the fibres of a fluid of different refrangibility which has not actually coagulated. From the latter condition recovery may be possible. In the former the opacities are permanent, but they need not necessarily be progressive. In any case, therefore, it is well worth while to seek for any existing focus of septic infection, whether in the teeth or elsewhere.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH.

IT is now ten years since the late Sir James Mackenzie founded at St. Andrews an institute with the main purpose of investigating the earliest symptoms of disease and the mechanism of their production. During its tenth year 150 new cases and 110 additional notes were added to the files, and 1271 specimens were examined in the laboratories. All the records have been reviewed and rendered as complete as possible, and the studies on the cytology of the blood were continued, as well as those on the ætiology of the common cold; the relation of respiratory catarrhs in young children to environmental conditions; the relation of the state of the tonsils to disease; and the variations in the temperature and pulse which are consistent with health, as distinguished from those which betray early signs of disease. New lines of investigation opened up during the year include an enquiry into the early manifestations of cancer, and a study of after-histories of patients with gastro-intestinal disorders, in an attempt to assess the prognostic value of radiological examination. The Public Health Department has succeeded in coördinating the work of the private and panel practitioner with that of the maternity and child welfare and school medical officers, and regards this administrative advance as one of first-class importance. Over 80 per cent. of all the children born in the burgh are supervised by the child welfare centre, the records of which include antenatal histories provided by the practitioners. The children are examined at regular intervals, however healthy they appear to be, and are observed continuously throughout their school years. In these ways the Institute is keeping alive the spirit of the great general practitioner and public health worker whose name it bears.

Sir Cuthbert Wallace has been appointed Director of Medical Services and Research to the Mount Vernon Hospital, Northwood, where the investigation of radium in the treatment of malignant disease is being actively pursued.

THE death occurred unexpectedly on Jan. 21st of Dr. Philip Boobbyer, who retired a year ago from the post of Medical Officer of Health of the City of Nottingham.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt.-Comdr H. Hurst to be Surg. Comdr.

ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Lt. A. D. Bruford to be Lt.
Proby. Surg. Sub-Lts. to be Surg. Sub-Lts.: J. N. Matthews and W. J. Poole.
Proby. Surg. Lt. T. G. Evans to be Surg. Lt.
Proby. Surg. Sub-Lt. B. Blewitt to be Surg. Sub-Lt.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lts. (on prob.) from the secd. list are restd. to the estabt.: W. G. Harvey, D. A'Brook, and T. G. D. Conceys.
Lt. (on prob.) W. G. Harvey is confirmed in his rank.
Lt. F. H. A. L. Davidson relinquishes his temp. commn.

TERRITORIAL ARMY.

Second Lt. H. W. Davies, from 16th Lond. R., to be Lt.

INDIAN MEDICAL SERVICE.

The undermentioned officers retire: Col. J. N. Walker, Lt.-Col. H. A. Williams, and Maj. M. Prasad.

COLONIAL MEDICAL SERVICE.

The following appointments have been made: Miss J. G. E. F. Cummins, Medical Officer, Gold Coast; Mr. P. J. Cowin and Mr. E. C. W. Maxwell, Medical Officers, Kenya; Mr. W. McCoach, Pathologist, Nigeria; Mr. W. E. Thompson, Specialist Surgeon, Palestine; and Miss M. M. McDowall, Medical Officer, Sierra Leone.

INDEX TO "THE LANCET," VOL. II., 1929.

THE Index and Title-page to Vol. II., 1929, which was completed with the issue of Dec. 28th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

POST-GRADUATE LECTURES ON CANCER.—The second lecture arranged by the Clinical Medical Studies Committee of the University of Sheffield in conjunction with the Yorkshire Council of the British Empire Cancer Campaign will be given in the Physics Lecture Room of the University on Tuesday, Feb. 4th, at 8.45 P.M., by Sir Lenthal Cheatle, Surgeon and Lecturer in Surgery, at King's College Hospital, London. His subject will be the Treatment of Mammary Carcinoma by Radiation, and all qualified medical practitioners are invited. Dr. J. Murdoch, Chief of the Department of Radium and Radiotherapy at the Brugmann Hospital, Brussels, has promised to give the third lecture of this series at some date in May.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

LX.

SIGNIFICANCE OF THE BLOOD CALCIUM.

PART II.*

Spasmophilia or Infantile Tetany.

As in the tetany of adults, the most constant feature in this condition is a low calcium content of the serum. In the acute form the calcium ranges between 4–6 mg. and in the latent form 7–8 mg. per 100 c.cm. These figures are not invariably found—for an active state of tetany may exist and yet the calcium be not less than 7 mg. per 100 c.cm.; the converse is equally true—latent tetany can exist with a blood calcium of not more than 5 mg. More accurate knowledge of the diffusible and non-diffusible fractions may furnish an explanation to this inconsistency. A similar state of tetany can be produced in rats on a deficient calcium diet; it is also known that this variety of tetany is far commoner in children who are bottle-fed than in those who are breast-fed. Sometimes this tetanic state occurs in a child who appears to be in the healing stage of rickets, and the explanation offered for this complication at this stage is that there is too rapid a withdrawal of calcium from the blood. The treatment of this condition is as dramatic as the established clinical state, and depends solely on increasing the level of blood calcium. In the acute stage the giving of calcium as $CaCl_2$ (2 g.) every two hours is generally followed by relief. As much as 6 g. can be given in 24 hours to an infant without any apparent intolerance. The best way of administering the drug is in milk; when the chloride gives rise to gastric upset the lactate or bromide salt may be tried, and in larger doses. An improvement in the condition is noted within half an hour and coinciding with this is a rise in the blood calcium. This rise is maintained for about 3–4 hours but is only temporary, and unless other measures are adopted, the blood calcium will fall again and tetany result. It has also been found that the administration of HCl or of ammonium chloride is equally efficacious in the immediate treatment of tetany—and this phenomenon has been cited as another example of the power of acid and acid-producing substances to increase the ionised calcium—although it seems that the total calcium is not raised. The HCl can be given in milk. K. Scheer, quoted by A. Hess, gives 260 c.cm. of N/10 HCl with 750 c.cm. of milk. Ammonium chloride can be given in doses of 5 g. a day. All these measures are only transient in their effect and must be followed by specific measures directed against tetany. Fortunately, these are equally striking in their effects and in order of potency can be given as irradiated ergosterol, ultra-violet irradiation, and cod-liver oil. It has been found that irradiated ergosterol has the power of raising the blood calcium to a normal value in 7–10 days, and, what is of still greater import, of maintaining the normal value for a prolonged period after the discontinuance of the remedy. In active tetany Hess recommends 20–30 drops a day and in latent cases 15 drops a day. When the blood calcium has returned to its normal value it is recommended that 5–10 drops be given for the following month. The standard of this remedy unfortunately varies and it is not until more uniform standardisation is forthcoming that any correlation in dosage can be made. As hypercalcæmia has been observed following the administration of irradiated ergosterol the remedy must be used with caution, and blood calcium studies performed frequently. Symptoms such as nausea, vomiting, and diarrhœa should signal this hypercalcæmia and the irradiated ergosterol should be stopped. Ultra-violet irradiation has also been found to lead to a higher blood calcium level and to relieve tetany—its action is far more rapid and certain than that of cod-liver oil—but it appears that it is not more than a good second to irradiated ergosterol. The treatment of this condition by active parathyroid extract is not justifiable, for its action depends on removing calcium from the bony stores; also symptoms of intolerance have been somewhat more frequent in children than in adults.

Rickets.

The calcium is not usually low in rickets—in a series of 72 cases J. Howland obtained an average of 9·6 mg. per 100 c.cm. It is not so much the low calcium as a low phosphorus value that is seen in rickets, and Howland and W. McK. Marriott have drawn attention to the importance of the Ca × P figure as an indication of rickets. A figure above 50 is found in health, while in frank rickets it is generally reduced below 30. A constant feature of rickets is the great loss of calcium in the fæces; when healing occurs there follows a retention of calcium and diminished loss in the fæces. The treatment of rickets with irradiated ergosterol results in raising the blood, phosphorus, and calcium values to normal; indeed, hypercalcæmia has been observed when this substance has been given as a prophylactic measure. The hypercalcæmia outlasts the symptoms of intoxication, which disappear with discontinuance of the treatment. A dose of 10 drops a day has been given with no untoward effects on the blood calcium.

Renal Rickets or Renal Dwarfism.

In this rare condition, in which signs and symptoms of a chronic interstitial nephritis are associated with bony changes and a retardation of growth, the blood calcium is often found to lie between 6 and 8 mg. per 100 c.cm., accompanied by a high phosphate content of 12–15 mg. per 100 c.cm. The cause of the condition is an unsolved problem, but it possesses many interesting features, among which is the rarity of tetany, although the calcium is often of such a low value in the blood that tetany would be expected. The explanation given for the absence of tetany is the acidosis that exists in this condition. No known treatment benefits renal dwarfism; increasing the blood calcium appears to be of no value.

Cœliac Disease.

In this condition growth is retarded, as in renal rickets, but bony changes are more uncommon. The blood calcium is often at a low value, and associated with the low calcium is a low phosphorus value. Tetany occurs, and in severe cases the bones show translucency of the shafts. The bulky fatty stools contain an excess of calcium, and it is to this loss of calcium that the low blood content is attributed. Some observers, notably E. G. Parsons, have claimed improvement in this condition by the institution of antirachitic measures.

Osteomalacia.

In this uncommon and fast-disappearing disease one of the most constant findings is a loss of calcium, both by the urine and the fæces. A recent study in China of ten cases showed the calcium to range between 7·4 and 5·2 mg. Out of these ten cases seven had tetany. It is interesting to recall the comparative frequency with which calcium calculi were found in the urinary tract by the older writers. While there seems to be a definite relationship between most cases of osteomalacia and defective hygiene and diet (as in rickets), some cases have been reported in which tumours of the parathyroid glands have been found. In one case the blood calcium was at a level of 16 mg., and the bony structure resembled

* Part I. appeared last week.

osteomalacia. As Hess remarks, it is probably quite wrong and certainly misleading to include such cases showing hypercalcæmia in the same group as osteomalacia.

Parathyroid Tetany.

When the parathyroid glands are removed accidentally—e.g., in malignant disease of the thyroid—the condition of "tetania-parathyroprevia," identical with that noted in experimental parathyroidectomy is found. Tetany, dramatic and sudden, results, and the blood calcium falls to a low level. With this is a lessened calcium excretion from the body. The condition can be relieved by calcium therapy, and also by the administration of the active parathyroid extract. In this condition, 2 g. of $CaCl_2$ can be given in 100 c.cm. of water intravenously—resulting in an immediate, though transient, rise in serum calcium. The injection must be given slowly, for toxic symptoms may occur. It has been observed that in time the organism adapts itself to a low calcium value, and the tetanic manifestations become only intermittent. A latent may be converted into an active tetany by œstrus in an animal, and menstruation has a like effect in women suffering from a deficient parathyroid secretion. Experimental work has shown that there is a decided reduction in the non-diffusible calcium in this condition—J. Cruickshank remarking that with an average of 4·95 mg. of serum calcium per 100 c.cm. in parathyroidectomised animals no less than 94 per cent. of calcium was diffusible. The active extract is the proper substitution product for this tetany, but the dose required to raise the serum calcium to normal value varies with each case, and frequent estimations are essential to gauge it. Some little evidence has appeared to suggest that this extract, like insulin, can be weakened in the presence of active sepsis, and that far larger doses are required in the presence of such sepsis to raise the blood calcium. In cases of tetany of this origin, the injection of $CaCl_2$ should be followed by dosage with the active extract subcutaneously, and a liberal amount of calcium by mouth. The extract can be given three times a day, and daily calcium estimations should be performed. Fortunately, such cases are rare, and this rarity accounts for our limited knowledge of the amount of parathyroid extract required.

Renal Disease.

In chronic Bright's disease associated with nitrogen retention there is a fall in the serum calcium. Accompanying this fall is a rise in the phosphates, but tetany is unusual, although muscular twitchings and convulsions are well-known occurrences. The rarity of tetany in this condition is explained by the acidosis that is present; as the acidosis increases the ionisation of the calcium enough free calcium is believed to be circulating to prevent symptoms of tetany appearing. In chronic parenchymatous nephritis the calcium is also at a low level, but not as low as in uræmia. Figures between 8 and 9 mg. are frequently found but tetany never occurs. It is believed that the low calcium in this condition is due to a fall in the non-diffusible fraction, which is combined with the blood proteins. With the loss of these proteins the calcium fractions in combination with them is also lost. An interesting clinical occurrence is the tetany sometimes found after heavy alkali therapy—bicarbonate tetany—and this is more likely to occur in patients with chronic parenchymatous nephritis. It is possible that a disturbance in the acid-base equilibrium causes this condition, although the calcium in the serum may not be very low. Hyperpnœa tetany, and gastric tetany are examples in which an alkalosis is produced and, it is believed, a consequent diminution in the ionic form of calcium—although the total calcium value is within normal range in these states.

There are other conditions in which calcium therapy is advocated, and in which parathyroid extract has been reported to be of decided benefit. Since calcification spells a healed lesion in tuberculosis, these remedies have been tried in various tuberculous conditions—especially of bone and of lung origin. Whether increasing the blood calcium in this condition will prove to be of value is not at present decided. Certain skin conditions, especially urticaria, although not associated with a lowering of blood calcium, are supposed to be benefited by increasing the calcium intake. Ulcerative conditions of the skin have also been treated with parathyroid extract, and improvement has been recorded by some observers, but the consensus of opinion is that no definite proof has justified the use of this extract in these conditions. Some time ago calcium and parathyroid extract were advocated in the treatment of sprue, but no conclusive evidence of their efficacy has since appeared.

Hypercalcæmia.

The importance of hypercalcæmia has only recently developed; it is now recognised both in the laboratory and in the wards. It has also been found to occur spontaneously in certain rare conditions. A figure above 13 mg. is regarded as being pathological. Values as high as 20 mg. have been obtained, and it has been shown that symptoms of hypercalcæmia are not always in proportion to the height of blood calcium. The symptoms may be only slight, such as nausea and diarrhœa, symptoms which may pass off when the stimulation causing the hypercalcæmia is discontinued. The classical signs found in dogs after excessive dosage with parathyroid extract are loss of appetite, diarrhœa, drowsiness, general muscular flaccidity, followed by coma and death. Intravascular clotting may occur before death. In addition to the high calcium content there is phosphate and nitrogen retention. Enough is known of hypercalcæmia to show that it is a state dangerous to the individual, and should not be produced unless at the same time control of the blood calcium is secured by daily estimations.

Certain bone conditions have been found in which a high blood calcium is obtained. An abnormal condition of bone may be associated with hyperplasia of the parathyroid glands—tumours of the parathyroid have been found in some cases. Associated with this bone lesion a hypercalcæmia may be discovered, and the lesion is regarded as being due to excessive function of these glands in draining the bony stores of their calcium. Although rare, a number of cases of generalised osteitis fibrosa have been recorded in which a marked hypercalcæmia has been found. Associated with this hypercalcæmia cysts or adenomata of the parathyroid gland have been discovered either at operation or on post-mortem examination. With the surgical removal of the cyst or adenoma the blood calcium falls to normal and immediate symptomatic improvement follows. An excellent and complete account of such a case has recently been given by Donald Hunter (1929), and C. G. Lambie drew attention to the same condition at the annual meeting of the British Medical Association in 1927.

The Parathyroid Extract.

As has already been stated, this extract has the power of increasing the blood calcium value, and it has been shown that this increase occurs irrespective of calcium intake. Indeed, definite proof has been produced that the calcium is obtained from the bone stores—a fact which has been made use of in the treatment of lead poisoning. D. Hunter and J. C. Aub were able to treat successfully cases of lead poisoning by repeated doses of parathyroid extract, and showed that coincident with a rise in blood calcium there resulted an increased secretion of lead as well as of calcium in the urine. The dose of active parathyroid extract (parathormone) can only be judged by the response of the blood, and daily observations on the blood calcium must be carried out.

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Special Articles.

A CLASSIFICATION OF BRIGHT'S DISEASE.

IN a report[1] issued by the Medical Research Council Dr. Dorothy S. Russell gives a detailed account of the minute structure of the normal kidney and of the changes in its structural elements that accompany the various pathological states described. Dr. Russell has availed herself of the data accumulated by Prof. Turnbull in the Institute of Pathology at the London Hospital, and of the clinical opportunities in the wards. Her attempt has been to supply working principles to enable the practitioner to pass from ascertained facts to an interpretation of the underlying structural changes.

Under the term Bright's disease have been included two kinds of disturbance of renal structure which can, according to Dr. Russell, be differentiated with certainty by the microscope, and which are due to two distinct pathological processes. One of these is a slow infarction due to arterial degeneration: an ischæmic nephritis. The other is an inflammatory reaction to bacterial or other toxins: a toxic nephritis.

Ischæmic Nephritis.

This may occur independently of toxic nephritis, and has then been called primary ischæmic nephritis. A certain amount is found in the kidneys of most adults; unusual degrees at any age are due to exceptional arterial degeneration and are in consequence most commonly complications of cardiovascular disease. The gross appearances of the kidneys show variations depending upon the nature of the arteries which are partly occluded. Severe degrees of primary ischæmic nephritis appear to give rise to occasional slight albuminuria and to the passage of hyaline casts into the urine, but no evidence has been obtained of any other interference with renal function. Any alterations in renal efficiency have been fully explained by heart failure, which so frequently complicates cardiovascular hypertrophy.

Inasmuch as there is no evidence that the actual condition of the kidney ever gives rise to any illness, it is doubtful whether primary ischæmic nephritis should be included in Bright's disease. Primary ischæmic nephritis may be complicated by a secondary toxic nephritis, but it does not render the kidney liable to this complication. On the other hand, primary toxic nephritis, at any rate of the kind distinguished as acris, tends to be complicated in its later stages by cardiovascular hypertrophy, and consequent arterial degeneration and ischæmic nephritis. Such secondary ischæmic nephritis is very seldom absent from the chronic examples of toxic nephritis, and in the most chronic form of toxic nephritis disturbances of the cardiovascular system may dominate the symptoms.

Histologically such secondary ischæmic nephritis can be distinguished with certainty from the associated toxic changes.

Toxic Nephritis.

This can be divided histologically and clinically into two main kinds. In one kind parenchymatous degeneration is the chief renal change and the inflammatory reaction is of low grade. Lipoid is typically very abundant. This kind of nephritis corresponds to the nephrosis of Volhard and Fahr, and the lipoid nephrosis of Munk; it has been distinguished histologically here as nephritis mitis.

Nephritis Mitis.—Examples of this have been found in an early stage before granulation and in an intermediate stage of granulation, but not in a late or chronic stage of sclerosis. In only one example of nephritis mitis in the intermediate stage was cardiovascular hypertrophy found, and the degree of hypertrophy was slight. Clinically nephritis mitis causes grave œdema, but no appreciable disturbance of renal function as estimated by the excretion of urea and dye: it gives rise to a hydropigenous nephritis. The mildness of the exudative inflammation is reflected in the cytology of the urine. Clinically the disease has no acute stage, and no appreciable difference was detected between the clinical symptoms in the early and intermediate stages. Death in all cases was due to an intercurrent infection, usually with pneumococci. Histologically nephritis mitis resembles the forms of nephritis that are symptomatic of endogenous toxins. No clinical evidence was obtained of the cause.

Nephritis Acris.—The other kind of toxic nephritis is distinguished histologically by the higher grade of inflammatory reaction, and has been called nephritis acris. The clinical characteristic of this nephritis is interference with renal efficiency: it is an azotæmic nephritis. Histologically nephritis acris resembles the nephritis symptomatic of bacterial infection. Where evidence has been obtained of a cause in examples not obviously symptomatic, the cause has been a bacterial infection.

Nephritis Acris Proper.—Nephritis acris can be separated into two divisions. In one division, acris proper, the inflammation is initially widespread and rapidly involves the kidney by extension. Examples have been obtained in an early stage before the appearance of granulation, in a stage of granulation, and in a late or chronic stage of sclerosis. In the early stage the clinical symptoms are those of a typical "acute hæmorrhagic nephritis." Our material representing this stage was obtained in years before the biochemical tests of renal efficiency were instituted. There was, however, clinical evidence of severe renal disturbance. The intermediate stage may be preceded clinically by the early, but more often starts insidiously.

In the more intensely inflamed examples the symptoms in the intermediate stage resemble those observed in the early stage, and death is due to renal inefficiency after a relatively short history. In the less intensely inflamed examples in the intermediate stage lipoid may be as abundant in the kidneys as in nephritis mitis. An insidious onset and the development of gross œdema are characteristic clinical features. Symptoms of renal inefficiency are present, but are seldom so striking as in the more intense type. The late stage is found on histological examination to follow only the less intense inflammation found among examples in the intermediate stage. Clinically it follows the milder illnesses of the intermediate stage or begins still more insidiously. In this late stage it is an azotæmic nephritis, accompanied or preceded by œdema. Cardiovascular hypertrophy, arterial degeneration, and consequent ischæmic nephritis make their appearance in the intermediate stage, almost without exception towards its close, and become more prominent and constant in the late stage.

Nephritis Repens.—The other division of nephritis acris is characterised histologically by the relatively focal nature of the initial inflammation and the slowness of its extension. No specimen of this condition has been found in the stages preceding sclerosis. Histologically the division has been separated into four types, which differ chiefly in diminishing degrees of intensity of inflammation and increasing slowness of extension of inflammation. These types have been distinguished more as a guide for future investigation than as a final classification. Taken as a whole this kind of nephritis is sometimes preceded at a long interval of time by an attack similar to that of the early stage of nephritis acris, but usually the terminal stage of uræmia is preceded by only trivial symptoms. With the exception of type (3), in which children and young adults are affected and renal regeneration is maximal, cardiovascular hypertrophy and consequent ischæmic nephritis are prominent features and are greatest in the most chronic type.

[1] Special Report Series. No. 142. H.M. Stat. Office. Pp. 248 and 16 plates. 8s. 6d.

Histological and Clinical Nomenclatures.

Alternative histological and clinical nomenclatures have been suggested for the various forms of nephritis described.

Histological.	*Clinical.*
1. Pure or primary ischæmic nephritis.	Primary arterio-sclerotic nephritis.
2. Toxic nephritis.	
(1) Nephritis mitis in— early stage. intermediate stage.	Subacute hydropigenous nephritis.
(2) Nephritis acris in— early stage.	Acute nephritis.
intermediate stage.	Subacute azotæmic nephritis.
chronic stage.	Chronic " "
(3) Nephritis repens.	Insidious chronic azotæmic nephritis.

Macroscopic Appearances.

The macroscopic appearances in Bright's disease are usually not only unsafe as a guide to the underlying pathological changes in the kidney, but may even be misleading: thus, a "large white" kidney may either be an example of nephritis mitis or of the less intense type (3) of nephritis acris in the intermediate stage, and a "red granular" kidney may be an example of primary ischæmic nephritis or of the most chronic type of nephritis repens.

Distribution of Lipoid.

Considerable attention has been paid to the occurrence, amount, and distribution of lipoid in the kidney in all the different types studied, because so much prominence has been given to this histological feature in other classifications of Bright's disease. It has, in particular, been so linked up with the "nephrosis" of Volhard and Fahr and the "lipoid nephrosis" of Munk, that the occurrence of large amounts in the kidney or urine has come to be regarded as diagnostic of this mild form of nephritis. It is evident, however, from our investigation that such an attitude is most misleading. Large amounts of lipoid are present not only in nephritis mitis but in many examples of nephritis acris in the intermediate and late stages, and in some specimens of nephritis repens. Moreover, a variable amount of lipoid has been constantly found in all types of nephritis acris and nephritis repens, with the exception of a few examples of nephritis acris in the early stage and a few examples of the most chronic type of nephritis repens. It is obvious, therefore, that there is no definite association between the occurrence of lipoid and any specified type of inflammatory reaction in the kidney, nor can the presence of large amounts of lipoid in the kidney be the explanation of the clinical peculiarities of nephritis mitis.

Tests of Renal Efficiency.

In view of recent statements to the contrary (Beaumont and Dodds, 1925) Dr. Russell points out the usefulness of the routine tests of renal efficiency that have been employed in this investigation. These tests do not give a ready-made diagnosis, but serve as a valuable accessory to clinical observations. The discretion needed in their interpretation is illustrated by a list of extrarenal factors that can produce modifications of the results, and additions to this list will probably be made in the course of time. In Bright's disease the tests are of great help. They appear to be essential in distinguishing between nephritis mitis and the less intense type of nephritis acris in the intermediate stage.

Their second great point of application is in the separation of primary ischæmic nephritis associated with cardiovascular hypertrophy (clinical hyperpiesia), from the type of nephritis repens that is characterised by maximal cardiovascular hypertrophy. In ischæmic nephritis there is no impairment of renal function, whilst most examples of nephritis repens are seen first in the final stage of the disease when renal function is definitely impaired. The degree of impairment as estimated biochemically runs parallel with the amount of destruction found microscopically. But during the earlier stages of this type of nephritis repens that precede renal failure it has been seen that the focal nature and slow progress of the destructive processes in the kidney are compatible with normal renal function as judged by the routine tests. Hence the separation of primary ischæmic nephritis from this type of nephritis repens in the latent stage cannot be achieved by renal efficiency tests alone. Further work is needed to determine what other clinical criteria, if any, can be used in elucidation of this difficult problem.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Psittacosis in Germany.

A PECULIAR disease has lately been observed in families which have newly purchased parrots. The usual symptoms have been high fever with unconsciousness, followed by a pneumonia which is peculiar in that discharge from the lungs is very small and the lesions spread in foci. Cardiac weakness appears early. The birds bought by the patients came from Brazil on a Hamburg steamer *Arcona*, and it is said that cases of infection by parrots have recently been reported in that country. Bacteriological research has shown that the disease is psittacosis, which has hitherto been almost unknown in Berlin. Anxiety has been aroused among the general public, and various kinds of illness in households where there are parrots have been ascribed to these unfortunate creatures. The Berlin Health Department, however, has stated that this nervousness is unfounded, since parrots which have not been recently purchased are harmless, and only those which have just come from Brazil need be regarded as suspect. None the less the Department condemns the custom of letting parrots peck sugar or other sweets from the lips of their owners. It is said that in the Zoological Gardens, where hundreds of parrots arrive every year from abroad, there has never been a case of psittacosis—probably because the Department insists on a control of zoological stores dealing with the sale of parrots and on a disinfection of the cages. At the present time parrots are being taken in large numbers to the veterinary college and to private veterinarians for examination, but so far only a few have been found ill. Among human beings there have been six deaths in Berlin, and also one death at Altona, which is beside Hamburg. The nurse and the doctor in charge of the dead patient in the hospital also caught the disease, but have recovered.

Measles in a Concentration Camp.

German peasants who were emigrating from Soviet Russia to settle in Canada were housed while passing through Germany in a concentration camp at Hammerstein in East Prussia. Already during their journey through Russia several infants had died, and in the camp a severe epidemic broke out affecting 192 children with 52 deaths. The nature of the epidemic was at first not quite clear, but it was soon ascertained that the disease was a severe form of measles with symptoms of septicæmia. A Government commission, including Prof. Friedemann, head of the department for infectious diseases of the Virchow Hospital in Berlin, was sent to the camp and reported that the disease had run an uncommonly severe course. This was due to the fact that the general state of the emigrants, and especially of the children, was very bad. They were underfed from the beginning, having received during their journey only bad bread, coffee, and tea; and the exertion of the long journey from Moscow to the frontier had made their state still worse. Similar cases had been seen, Prof. Friedemann said, during the late war, when the condition of children was rather like that of the emigrants. By order of the Government the Hammerstein camp was put under quarantine. Children received a diet rich in vitamins, and prophylactic

immunisation was performed. As it was impossible to provide a large enough quantity of convalescent serum for this purpose, the serum of the parents was successfully used. By these measures the spread of the epidemic was finally stopped.

Birth Control and Population.

Dr. Grotjahn, professor of social hygiene at Berlin University, has been speaking on the problem of birth control from the standpoint of keeping up the population. He pointed out that on a one-child or two-child system the time when the population will disappear can be calculated with mathematical certainty. To maintain the population every family must bring up at least three children, and as this is impossible there must be a number of families with more than this in order to cover the deficiency of those marriages which are sterile. Twenty births to each thousand of the population he regards as necessary. This number is at present not attained in Germany; in 1927 throughout the country registered births amounted to 18·3 per thousand, while in the larger towns the figure was only 14. In France it has been 18·5 for several years, whereas in Germany the decrease is progressive. Sixteen living births per thousand were registered in 1927 in Paris, as compared with 10·5 in Berlin. In France families with many children receive Government subsidies and for Germany Prof. Grotjahn recommends compulsory insurance for parents to stimulate the will to bring up children. People think that Germany is overcrowded, but the housing and the unemployment problems cannot be solved by birth control, for the decrease of births will only have their effect on the labour market after 16 or 20 years, whereas unemployment is an actual and passing problem. On the contrary, there is likely to be a deficiency of workers within a few years as a result of the war. In 1928, 1,924,000 youths entered work on leaving school, but owing to the decrease of births during the war there will be only 700,000 annually in the three following years. If the drop in the birth rate goes on the German population will be reduced to an extent never previously contemplated.

The Right to Canvass.

A medical man, on settling in a Berlin suburb, sent cards to the neighbouring families to advertise his arrival. Being prosecuted before the provincial court of honour he was fined 50 marks, but later the appeal court of honour in Berlin gave him a verdict of "Not guilty." The judgment stated that it is not against the medical ethics for a medical man to announce his settlement if this is done in a suitable way. For this purpose local newspapers are usually employed, but the recognised rule is that an advertisement should not appear more than once. The cards sent by the defendant merely announced the fact of his settlement, and the court held that no distinction could be made between an advertisement in a daily paper and canvassing by cards sent to neighbours.

Tuberculosis of Infants.

The Berlin Pædiatric Society lately discussed the infection of infants living in the same houses as tuberculous patients. Calmette has stated that in France the mortality of such children is 24 to 80 per cent., but according to the figures given to the Society by Dr. Peyser, head of the municipal dispensary for tuberculous infants, the number is much smaller in Germany. In Berlin only 5·1 per cent. of infants have died from tuberculosis in the first year of life, 3·4 per cent. in the second year, and 0.5 per cent. in the following years. There is no difference whether the dwelling is in a good hygienic condition or not: the principal cause of infection is the mass of bacilli spread by the parents in the dwelling by coughing and therefore a repression of that nuisance as taught in the sanatoriums is essential. Early and prolonged isolation of infants is recommended.

The German Red Cross has 7429 branches and affiliated organisations with 1,379,843 members. It has increased in the last year by 66 branches with 41,308 members. The Red Cross controls 414 hospitals, sanatoriums, maternity hospitals, and homes for convalescents, children, and the aged, with 17,651 beds. There are, further, 517 advisory offices for mothers, and 127 tuberculosis dispensaries. The number of nurses belonging to the Red Cross is 8673. There are 2804 ambulance detachments with 101,058 members.

A course of practical cooking was lately held in the Braunlage-Sanatorium in the Harz Mountains under the patronage of the Balneological Society and the Association for post-graduate study. The 97 medical men and women who attended were able to learn practical cooking, especially for dietetic purposes; they not only acted as cooks in the kitchen of the sanatorium but also attended lectures delivered by specialists from Berlin.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Public Health in the Free State.

THE annual report of the Department of Local Government and Public Health for 1927–28, recently issued, gives particulars of the public health work carried on in the Irish Free State, as well as of the other activities of the local authorities. There has been some increase in enteric during the year, observable in the rural areas. There has been a slight increase in the number of tuberculous patients treated under approved schemes. There are 140 institutions approved for the treatment of tuberculosis, and 142 tuberculosis dispensaries. The death-rate associated with childbirth has shown little tendency towards reduction notwithstanding the increased application of measures for the regulation of midwifery practice. It is noticeable that the maternal mortality of rural districts has a distinctly worse record, and that the statistics show the larger towns to suffer least heavily from puerperal deaths. The infant death-rate, on the other hand, has undergone a decided reduction, although the experience of recent years indicated that a stationary condition had been reached. In the rural districts it is definitely low, but the virtual doubling of the rural rate under urban conditions produces a result that can only be described as high. The number of vaccination defaulters is diminishing. It is stated that there are 26 counties in which county medical officers of health have been appointed, or are about to be appointed. The county medical officer of health has jurisdiction over the whole county, and is responsible for all that relates to preventive medicine, personal as well as environmental. His jurisdiction extends over school medical services and tuberculosis services. In County Cork there are, besides the county medical officer, three whole-time assistant medical officers. Steps are being taken to train and to appoint whole-time sanitary inspectors. The grants to assist housing have increased during the year.

Milk in Cork.

Dr. J. C. Saunders, medical officer of health for Cork, draws attention, in a recent report, to the unsatisfactory conditions under which milk is sold in that city. The vendors of milk from vans and carts have little notion of cleanliness; vans, vessels, and vendors' clothes all being dirty. It is little better as regards conditions of sale in shops. The premises are usually unsuitable; there is insufficient ventilation, and the shops that sell milk commonly deal also in such articles as coal, vegetables, dried fish, salt meat, and paraffin oil. It is an anomaly of the Dairies, Cowsheds, and Milkshops Order that while the sale of milk in unsuitable premises is an offence there is no way of dealing with it except by prosecution; the local authority has no power to refuse registration to the vendor.

MEDICINE AND THE LAW.

Removal from the Register: Colonel Kynaston's Appeal.

THE dismissal of Lieut.-Colonel J. W. Kynaston's appeal has added little to the legal position already well established. The appellant's name was removed from the Medical Register some years ago, not on account of conduct in any way criminal, but for an infringement of professional standards in the matter of advertising. He has himself always maintained that he acted throughout in what he believed to be the best interests of the public, and no one credits him with improper motives. At the end of last July he made an attempt to reopen his case by applying for a rule for a mandamus ordering the General Medical Council to delete from the Register all record of his name having been removed penally. As was reported in these columns at the time, the Divisional Court discharged the rule and refused to do what he asked, Lord Hewart making some vigorous comments upon the impossibility of the course suggested. When Colonel Kynaston appealed to the Court of Appeal against the Divisional Court's decision, it was intimated to him that he must appear this time by counsel, and not in person. His counsel put the case, however, with no greater success than previously. The simple point submitted on Colonel Kynaston's behalf was that in March, 1922, when no charges of unprofessional conduct had been preferred against him, he applied to have his name taken off the Register. The Council, he contended, should have given effect to his wishes, in which case there could not subsequently have been a removal on penal grounds; the Council had no right to assume that a doctor's name, having once been enrolled in the Register, must remain there till his death, or until removal by the Council; a doctor need not put his name on the Register and need not keep it there either. To this contention the Court of Appeal has made the same answer as the Divisional Court. Lord Justice Scrutton says he cannot find in the Medical Act anything to say that a practitioner can come off the Register at his own request by merely writing a letter. "It is idle to suppose that an inquiry into infamous conduct can be avoided by taking a name off the register." The Lord Justice reiterated the legal principle, which so many cases have established beyond all doubt, that the General Medical Council is judge, without any appeal, in any case of infamous conduct in any professional respect. He thought it a pity that the word "infamous" was used in the Statute; what the Act meant was serious misconduct in a professional respect, that is to say, viewed in the light of the rules governing the profession. The facts showed that there was evidence to justify the Council's finding in Colonel Kynaston's case: the only circumstances in which a Court of Law would have intervened would have been if there had been no such evidence.

The rest of the grounds for Colonel Kynaston's appeal were rather shadowy. They consisted of an attack on the General Medical Council's Standing Orders as ultra vires, and an attack on the Council's decision as vitiated by bias. The latter point involved the suggestion that Sir George Newman was a member of the tribunal, might have considered himself criticised by Colonel Kynaston's writings, and so on that account either might have been a biased adjudicator or might have been thought biased. The evidence made it clear that Sir George Newman withdrew from the tribunal before it deliberated. The suggestion, already dismissed as unfounded by Lord Hewart last July, was waived aside by Lord Justice Scrutton as hopeless. It may be hoped, indeed, that the last has been heard of it. That it could ever have been relied upon is evidence of the difficulty of a litigant who, in the face of the known reluctance of the law courts, seeks to ask the judges to reopen the decisions of the General Medical Council.

Journalists at Inquests.

The attendance of a journalist at an inquest at a private house—no jury was empanelled—was recently brought into question by a rector of a Sussex parish. The rector wrote to the editor of the newspaper represented by the journalist protesting against what he considered "the abominable cruelty of sending a complete stranger to intrude upon people's private griefs by thrusting himself into an inquest upon a little only child, whose parents had suffered as much as people can suffer already, and where the facts of the case could perfectly easily have been ascertained without the infliction of further brutality." "That you have a legal right," the rector added, "to send people to make capital out of other people's woes does not in the least mitigate the ghoulish cruelty of it in the eyes of decent people." At an inquest a few days later, Dr. E. F. Hoare, the coroner for East Sussex, after making an appeal to the Press to omit certain details (in this case at an inquiry with regard to the death of a newly-born child), pointed out that he was vested with authority as to publicity. He said secrecy was most undesirable except in the interests of justice, on the grounds of public decency, or for the avoidance of material hardship, under the Indictable Offences Act, 1848. He referred to the rector's letter and said, distressing though it might be at the moment, publicity was ultimately the greatest safeguard against ill-natured gossip, and frequently those most upset by the idea of publicity afterwards said how glad they were that matters had been brought into the open. As regarded the presence of the Press at inquests held in private houses, the Coroner said it might at first sight seem an intrusion on private liberty, but it should be borne in mind that the using of a private house was only done to mitigate, as far as possible, the distress of relatives. The alternative of using a public hall open to the general public only opened the inquiry to those attending from motives of idle and morbid curiosity. Those resentful of publicity, Dr. Hoare went on to say, might be relieved to know that under the Coroner's Amendment Act inquests only comprised some quarter of the total deaths inquired into, and were practically limited to violent or unnatural deaths, and in less than one-half of those was a jury required. "There does not appear, therefore, an undue desire for publicity on the part of the legislature," the Coroner said, "nor can I consider that my sanctioning the presence of a reporter is an act of 'ghoulish cruelty.'" The Coroner concluded by stating that he knew of many acts of consideration on the part of the Press, but none of intrusion in an objectionable sense.

A CENTRAL ISOLATION HOSPITAL IN NORFOLK.—The Norfolk County Council has decided, in principle, to provide one central isolation hospital for the county, at an estimated cost of £30,000. It will serve nine urban and 19 rural districts and it is proposed to erect it on a site belonging to the Council at East Dereham.

DONATIONS AND BEQUESTS.—Miss Amelia Florence Pemberton, of the Round House, Havering-on-the-Bower, Essex, left £1000 to the Victoria Cottage Hospital, Romford, for the endowment fund.—Mr. John McCallum, of Ardskipness, Paisley, left £1000 to the Royal Alexandra Infirmary, Paisley, £500 to the Royal Victoria Eye Infirmary, Paisley, and £500 to the Paisley Convalescent Home, West Kilbride, Ayrshire.—Mrs. Hannah Donkin, of Southfield House, Wimbledon Park, left over £20,000 to charities, including £3000 to the Whitley Village Homes, £2000 each to Dr. Barnardo's Homes and the Shields Infirmary, and £1000 each to St. Dunstan's Hostel for Blinded Sailors and Soldiers and the National Institute for the Blind.—Mr. William Brown, of Inverloy, Ayr, left, free of legacy duties, among other donations, £1000 each to the Ayr County Hospital and the Royal Hospital for Sick Children, Glasgow; £500 each to the Royal Infirmary, Glasgow, the Western Infirmary, Glasgow, and the Royal Cancer Hospital, Glasgow.—Mr. Benjamin Webb, of Bow-road, Poplar, left £1000 to the London Hospital and £500 to the Brompton Hospital for Consumption.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

A SURVEY OF 1928.

WE have had the opportunity of summarising reports dealing with a great part of the population of Great Britain, and it may not be without interest to consider what evidence of progress in public health matters is to be gleaned from them. The year 1928, it may be noted in passing, was sunnier than its predecessor.

General Sanitary Measures.

Housing.—In most districts fewer new houses were erected, and there are signs that the demand for houses from families who can pay a reasonable rental is being gradually overtaken. A few districts are now beginning to take up slum clearance, but the new houses built are beyond the reach of the very poor. Amongst efforts to cater for the latter class Glasgow is to endeavour to provide an all-in 10*s.* house; and Stafford has earmarked 40 houses with three bedrooms on the municipal estate to be let to necessitous applicants at 9*s.* weekly including rates. Voluntary housing associations are taking a hand. A Lincoln society aims at providing 100 houses at 6*s.* 6*d.* per week (inclusive), and a York society at purchasing existing houses, renovating them, and letting them at weekly rentals from 3*s.* 6*d.* to 6*s.* 6*d.*, with Octavia Hill management. Perhaps the Cambridge society's contribution is the most noteworthy as it has actually provided 45 houses at rentals of 6*s.* 6*d.* (exclusive of rates) with a reduction of 6*d.* per week for each child of school age down to a minimum of 5*s.* Sheffield Corporation have set aside a number of houses for families which include an open case of tuberculosis. Other suggestions are the reconditioning of existing houses in order to provide accommodation for poor tenants evicted by slum clearance schemes, and national legislation for the prevention of the exorbitant rentals often demanded for houses-let-in-lodgings. Many medical officers speak approvingly of the Housing (Rural Workers) Act 1926, but as yet very little use has been made of its provisions.

Smoke Prevention.—The control of domestic smoke appears to be reaching a more practical stage. Several reports refer to the much more tarry deposit in residential than in industrial areas, owing to the less perfect combustion of the coal in domestic grates, and a much greater interest is being aroused in the production of smokeless fuel. It is even suggested that we are nearing the time when the burning of raw coal in the domestic grate will be prohibited. As regards industrial smoke, the new method of raising steam by the use of pulverised coal has evidently not been perfected yet, as several districts complain of the resulting nuisance from the emission of grit.

Rivers Pollution.—After the war many sewage disposal works suffered from the need for economy, but there are now signs of a greater desire to improve the condition of our rivers. More research is needed as to the best way of dealing with wastes from collieries, artificial silk, and beet sugar factories. On the other hand, it is now realised that the attempt to keep trade wastes out of the sewers has been in the past carried too far.

The *Health Education* of the public has received much more attention than in previous years. The circulation of the journal *Better Health* has now reached 268,000.

Food- and Water-supply.

Milk.—Better methods of milk production have been promoted by an increasing number of clean milk competitions and demonstrations in many counties, and more satisfactory premises are being provided under the Milk and Dairies Order, 1926. Systematic veterinary inspection of dairy cattle is a plant of slow growth, and in this matter the English counties lag behind the Scottish, but among the more populous counties Surrey has begun quarterly inspection, and Durham is making preparations for doing so. In many districts the percentage of tuberculous milk samples showed an increase in 1928, and there is no evidence that cows with udders affected and other signs of tuberculosis are being weeded out from dairy herds or notified by farmers at an early stage of the disease. The investigation of "outside" complaints of tuberculous milk has frequently ended in failure to trace the offending cow. The bulking of the milk from several farms at depôts in some cases increases the difficulties of these investigations. Several reports show that it is no easy matter to maintain a tested herd tubercle-free, and the county veterinary inspectors of Dumfries advocate double fencing and also the temporary segregation of new purchases to allow time for a possible incubation stage to elapse. In Scotland, too, we believe the risk of grazing tested herds on pastures which have been used by untested stock has been pointed out. The available quantity of graded milks has shown no rapid increase, and from several districts objections have come to the misleading designations at present adopted. Grade A is said to be regarded by the public as the highest quality of milk. Certified milk is usually about twice the price of ordinary milk, so perhaps it is hardly surprising to learn that the supply of this milk in the County of Dumfries already exceeds the demand. Apart from the London paratyphoid outbreak, considered to be due to infected cream, milk-borne infectious disease appears to have been less than usual in 1928, but a few small outbreaks of scarlet fever and diphtheria were traced to this source.

Water.—Most counties reported inadequate water-supplies in their rural parishes, and this creates especial difficulty in dairying counties. Even when we have obtained a national allocation of the available water, it will be difficult to provide a proper supply for many parishes at a reasonable cost.

Meat.—The new abattoir at Liverpool was begun during the year, and Coventry has obtained an ideal site for the same purpose. The improvement of imported meat will no doubt be promoted by the visit to the Colonies and the U.S.A. of the chief veterinary inspector of the City of London as the result of an invitation from the Governments of Australia and New Zealand.

Infectious Diseases.

Small-pox has been prevalent in many districts. In a large proportion of cases the introduction of the infection has been due to tramps. Few deaths were reported and the mild type is still breeding true.

Measles was epidemic in many districts, including London, during the year. The policy has been adopted in many districts of giving measles the preference over scarlet fever for hospital admission.

The use of antitoxin for *scarlet fever* is reported upon favourably, and several isolation hospitals claim to be discharging scarlet fever cases after 28 days without harmful results. In the Leicester hospital it is claimed that even better results are obtained by giving the antitoxin intravenously instead of intramuscularly.

There have been fewer cases of *encephalitis lethargica* notified, but the case fatality has been higher in many districts, and the unsolved problem of providing for the damaged survivors is referred to by many medical officers.

Glasgow had its first epidemic of *acute poliomyelitis* during the year. The acute cases coming to the knowledge of the health department numbered 112, mostly during July to October. This epidemic preceded the arrival of *influenza* (which was not prevalent in this country in 1928) from America during the early months of 1929.

The provision of hospital treatment for *pneumonia* is being urged more and more.

A few cases of *anthrax* have been reported, usually contracted from handling foreign hides, and Liverpool

has put on record a series of cases successfully treated with serum without the excision of the malignant pustule.

Reports of *dysentery* came from Aberdeen, Manchester, Birmingham, Newcastle, and Staffordshire, and the suggestion is made that if the necessary bacterial examinations are made, it may be found that this disease is much more common in this country than has been hitherto thought.

Immunisation schemes against *diphtheria* continue to grow in number, and non-immunised isolation hospital staffs will soon be an exception. From most districts come complaints of delay in giving antitoxin, frequently because medical aid was not sent for sufficiently early.

A case of *undulant fever* was reported from Cardiff, and the subsequent discovery of *Brucella abortus* in several milk samples has raised the point as to whether milk-borne undulant fever may not be commoner than generally supposed.

Mosquito control is receiving more attention, and from Walton-on-Naze, Essex, came reports of a few cases of indigenous malaria, associated with the discovery of anopheline mosquitoes and the presence of ex-malarial subjects.

Maternity and Child Welfare.

The demand for more institutional lying-in accommodation is being gradually met and antenatal clinics are being established in connexion with all new maternity hospitals and homes. It is being realised that such clinics must be conducted by obstetricians. During 1928 an increase was recorded in the maternal mortality from sepsis in several districts. In some cases the appointed consultant obstetrician is being asked to investigate the cases of puerperal sepsis and the deaths from childbirth for the Ministry. A uniform international method of classifying maternal deaths in connexion with childbearing is much needed. Infant mortality is fast becoming a problem of early deaths from prematurity, &c., and of later deaths from respiratory diseases associated with measles and whooping-cough. The statistics we have given show that the chance for the young child (1 to 5 years) varies even more with the locality than infant mortality. Since the immediate after-effect of the war the birth-rate has not varied materially from year to year, so that the number of deaths in a locality at the age-period 1 to 5 per thousand births of the same year is a sufficiently reliable index of young child mortality. According to this index the young child mortality in 1928 was four times as heavy in Glasgow as in Leicester, and more than twice as heavy in the counties of Durham and Fife than it was in the counties of Somerset, Norfolk, Hampshire, and Northamptonshire. These are merely a few examples taken from our tables. Though opinions varied, there were many favourable verdicts as to the benefits derived from artificial light out-patient clinics, and frequently it was mentioned that the mothers who bring their children are favourably impressed by the results.

Other Municipal Schemes.

Tuberculosis schemes were hampered by the failure to secure early notification. Artificial pneumothorax is being more and more used in suitable cases by tuberculosis officers. As regards V.D. schemes, the percentage of default continued high. Many districts reported a rise in new cases, especially gonorrhœa, but it would be difficult to say whether this increase was due to a rise in incidence or to greater confidence in the treatment offered. On April 30th another rheumatism supervisory scheme was initiated—namely, at Croydon—with full coöperation of parents and teachers, but without provision for institutional treatment. It is much to be hoped that some provincial county borough will put in hand a complete scheme with provision for short stay and long stay cases in order that the possibility of preventing relapses and cardiac complications may be tried out.

MENTAL HOSPITAL REPORTS.

THE *East Sussex Mental Hospital* at *Hellingly* has published its report for 1928. On Jan. 1st, 1929, there were 1261 patients in the hospital. The recovery-rate for the year was 31·22 per cent., a lower figure than that for the preceding year on account of the unfavourable prognosis in a large proportion of new cases admitted. The death-rate was 6·82 per cent. There was a slight outbreak of influenza in March, and a rather more serious outbreak of scarlet fever in the autumn. The visiting surgeon performed 14 major operations, all of which were successful. The dental surgeon and the ophthalmic surgeon attended regularly, and submit special reports. They investigate thoroughly the teeth and eyes of all new patients, who receive also a searching physical examination supplemented by laboratory tests on the blood and urine. Parole was extended during the year, and at the end of it 55 men and 153 women were free within the grounds. Of the patients discharged 54 were first sent out on trial, 28 of them with a money allowance. The Swedish drill classes were again found to be of great benefit to the patients. A full account is given of the malarial treatment of 17 general paralytics. The results were not so good as in 1927. There is no organised occupational therapy, but about 14,000 new articles were made in the work-room during the year. The pathologist, in addition to carrying out the routine work of the institution—about 2000 tests of various kinds—also tests suspected tuberculous milk or organs for the public health authority. He has also found time for research into methods of analysis and into the causes and effects of mental disease. The urochromogen reaction has been found unreliable, but the complement-fixation test, elaborated on the lines of the Medical Research Council's No. 3 method, has proved very valuable. The Kahn test has been found less reliable than the Wassermann. The intestinal flora of patients has been studied and found abnormal in more than 80 per cent. Renal efficiency of general paralytics has also been investigated, and the malarial treatment has been found to throw a distinct strain on the kidneys and liver. The pathologist believes that more deaths of mental patients are due to renal poisoning than is commonly believed, and proposes to investigate this factor. The medical superintendent conducts a weekly clinic at the Princess Alice Hospital, Eastbourne. The shortage of female staff caused considerable anxiety. A social club for them has been organised, and everything possible has been done to improve their status. Three male and seven female nurses obtained their R.M.P.A. certificate during the year.

The report of the *Stirling District Mental Hospital* for the year ending May 15th, 1929, also appears somewhat belatedly. At the end of the year there were 964 patients on the register, 300 having been admitted during the year—a record number. In addition there were 24 voluntary patients. This increase put a heavy strain on the accommodation, which is unfortunately still burdened by a large number of mental defectives. The directors of the Stirling Royal Infirmary have asked the superintendent of the Mental Hospital to act as honorary visiting consultant to their new out-patient department for mental and nervous ailments. They have thus set an example to other provincial hospitals of Scotland. The recovery-rate in the institution was 37·44 per cent., and the death-rate 12·1 per cent. Autopsies were held in every case where permission could be obtained. There was an outbreak of influenza in the spring, but otherwise the general health was satisfactory. Modern methods of electrical treatment were applied to 135 patients, and the X ray apparatus was used for diagnosis in 22 cases. The dental surgeon visited weekly. An occupational instructress has been appointed and patients who cannot be occupied in any other way are taught rug-making, basket-, raffia-, and leather-work. The farm and gardens provided employment for about 200 male patients, and recorded a very good year. Nine nurses and four attendants obtained the R.M.P.A. certificate.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 11th, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 335; scarlet fever, 2821; diphtheria, 1740; enteric fever, 48; pneumonia, 1533; puerperal fever, 56; puerperal pyrexia, 110; cerebro-spinal fever, 17; acute poliomyelitis, 8; encephalitis lethargica, 23; dysentery, 10; ophthalmia neonatorum, 96. No case of cholera, plague, or typhus fever was notified during the week.

The cases of small-pox were reported from the following 13 counties: London, 169—namely, Bethnal Green, 50; Shoreditch, 38; Stepney, 18; Southwark, 13; Hackney, 11; Poplar, 10; Islington, 9; Camberwell, 7; Finsbury, 5; other boroughs, 7—Buckingham, 4 (Wycombe); Durham, 2 (South Shields); Essex, 44 (of these West Ham, 40; East Ham, 2); Lancaster, 6; Leicester, 24 (19 in the county borough); Middlesex, 4 (Tottenham, 3; Wood Green, 1); Northumberland, 1; Stafford, 10 (Stoke-on-Trent); Sussex, East, 2 (Eastbourne); Yorks, West Riding, 28 (Barnsley, 8; Dewsbury, 4); Glamorgan, 8 (Merthyr Tydfil, 2; Rhondda, 6); Monmouth, 33 (in 6 areas).

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on Jan. 14th–15th was as follows:—Small-pox, 503 under treatment, 39 under observation (last week 437 and 27 respectively); scarlet fever, 2538; diphtheria, 2684; enteric fever, 24; whooping-cough, 124; puerperal fever, 28 (plus 18 babies); encephalitis lethargica, 123; poliomyelitis, 2; "other diseases," 17. At St. Margaret's Hospital there were 13 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 1 (1) from enteric fever, 43 (18) from measles, 11 (2) from scarlet fever, 20 (2) from whooping-cough, 45 (12) from diphtheria, 53 (14) from diarrhœa and enteritis under two years, and 67 (16) from influenza. The figures in parentheses are those for London itself.

Wigan and Manchester each reported 4 deaths from measles, Portsmouth and Wakefield each 3. Three deaths from scarlet fever occurred at Liverpool and 2 deaths from whooping-cough at Stoke-on-Trent and Bradford. Diphtheria again claimed 4 victims at Birmingham and 3 each at Bristol and Liverpool.

The number of stillbirths notified during the week was 249 (corresponding to a rate of 36 per 1000 births), including 32 in London.

Correspondence.

"Audi alteram partem."

PSITTACOSIS.

To the Editor of THE LANCET.

SIR,—The question of the identity of psittacosis and *aertrycke* infections is of great interest. In 1920 Colonel Marrian Perry, as he has reminded us, proved that *B. psittacosis* and *B. aertrycke* (Mutton type) are identical according to all known methods. But there exists a wide difference in the descriptions of the clinical manifestation of the two infections. Thomson describes psittacosis as "an illness of typhoid type, complicated by unusual signs in the lungs." Vomiting is frequent. Some diarrhœa is certainly common. Epidemics due to *aertrycke* infections are remarkable for the constancy of their cardinal features—viz., diarrhœa, vomiting, and abdominal pain. Pyrexia is variable and pulmonary complications are absent. Is there any evidence of clinical types linking these differences between psittacosis and *aertrycke* infections?

Dotted through the literature we find records of sporadic cases of infection with *aertrycke* bacilli exhibiting unusual symptomatology, often suggestive, though not characteristic, of enteric. As a single instance I may mention a case recorded by Rowland, Marshall, and Menton[1] which for a time suggested enteric, and which was identified as being due to *B. aertrycke* (Mutton type). In the reports of epidemics such instances are very rare.

In April, 1918, a large epidemic of diarrhœa and vomiting occurred in a convalescent depôt in France. Colonel Marrian Perry and myself were placed in charge of the investigations. The epidemic was proved to be due to *B. aertrycke* (Newport strain). Of 1060 cases under direct observation with diarrhœa and vomiting, none developed any pulmonary complications; three died, all from uncontrollable vomiting. But at the same time that the outbreak of diarrhœa and vomiting occurred many men reported sick with a different type of symptoms characterised by high temperature, general malaise, and various pains, but no diarrhœa. We assumed that this type was due to a concurrent epidemic of influenza which was fairly rife at the time. Some of these cases developed a mild diarrhœa, and there can be no doubt that many of them were infected with *B. aertrycke*. Most of these cases were seen in the early stages of the epidemic of diarrhœa and vomiting. Obviously it is possible that we were mistaken in believing that their prominent symptoms were influenzal, and they may have been due in reality to the *aertrycke* infection. It is probable that there were about 200 cases of this type, and there were certainly over 2000 cases with diarrhœa and vomiting.

It will be noted that there is a marked difference in the usual method of infection in the two conditions. Cases of psittacosis are nearly all sporadic and infection is direct from sick parrots. Recorded infections with *aertrycke* are nearly all epidemic and due to infection from food. It is known that sporadic cases of many epidemic conditions tend to exhibit clinical peculiarities. It appears probable that psittacosis and *aertrycke* infections will prove to be identical, or very closely allied, and some of the mysteries of food poisoning epidemics may be cleared by this unexpected development.

I am, Sir, yours faithfully,

H. LETHEBY TIDY.

Devonshire-place, W., Jan. 20th, 1930.

[1] Brit. Med. Jour., 1928, i., 439.

SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—In his interesting article on spinal anæsthesia in THE LANCET of Jan. 18th, Dr. Falkner Hill states that "the fear of a fall of blood pressure is a relic of a different technique in which the anæsthetic solution was heavier than the cerebro-spinal fluid, and was not fixed. The patient had to sit up, the Trendelenburg position was not available, and a dangerous anæmia of the medullary centres might occur." This teaching, once widely imparted, had, I thought, long been abandoned; it is entirely erroneous, based neither upon observation nor experience, but upon tradition, and nothing more. Barker's solution has been used many hundreds of times with the patient in the Trendelenburg position; my own practice for many years was to inject in the lateral position with the head slightly raised, to lower the head to the body-level within three to five minutes, and to place the patient in the high Trendelenburg position within eight to ten minutes from the time of injection. The anæsthetic agent, whether stovain, tropa-cocaine, or novocain, is, I believe, rapidly fixed; control over the height of analgesia is quickly lost. It is for this reason that I have always taught that a heavy solution is the only one which gives the anæsthetist any measure of control; the "light" solutions and Dr. Pitkin's spinocain seem to me to act in the most delightfully irresponsible manner. I agree with Dr. Falkner Hill in his criticism of Dr. Pitkin's claim of controllability. One of the most surprising facts which was noticed at Dr. Kelly's demonstration of spinocain at St. Peter's Hospital last summer was that Dr. Pitkin is

experimenting with a heavy solution of novocain somewhat similar to Barker's stovain solution. Dr. Kelly used it in one case. The 10 per cent. novocain solution commonly employed in this country gives very good results, although relaxation is not so complete as with stovain, and I have used it for some time in place of the latter, not from reasons of dissatisfaction, but for purposes of comparison.

I am, Sir, yours faithfully,

FRANCIS SHIPWAY.

York-terrace, N.W., Jan. 19th, 1930.

To the Editor of THE LANCET.

SIR,—Dr. E. Falkner Hill, on p. 124 of your last issue, criticises Pitkin's spinocain, and suggests that it "gives little control over the duration of the anæsthesia, less over its height, and practically none over the blood pressure," and asks "in what does the excellence of the method consist?"

To me the method appeared to be based on a good deal of fallacious reasoning supported by a series of highly imaginative diagrams. I therefore rejected it on purely theoretical grounds. Dr. Hill's account of his results strengthens my opinion.

In what way do the results obtained by this method differ from those following the use of ordinary solutions of novocain in normal saline, which are, in fact, controllable? When novocain saline solutions are used the patient may be at once put in the moderate Trendelenburg position without danger, provided that the dose of novocain is correctly chosen. The level reached depends entirely upon the amount of the dose injected. With a heavy solution the posterior roots are always more affected than the anterior, especially in the higher levels, and sensory paralysis extends higher than motor. Ten per cent. novocain in normal saline has a specific gravity of 1·023. Spinal fluid averages from 1·006 to 1·008, but Levinson gives a series of estimates varying between 1·001 and 1·010. With the new drug percain it is possible to have a solution made with half-strength saline, specific gravity 1·003, or much less than the spinal fluid.

If enough of this solution is injected to reach the upper nerve roots, the anterior roots are more affected than the posterior, and I have been able to observe a case in which the abdominal muscles were completely paralysed, and the patient remained sensitive in the zone of D10. The case quoted by Dr. Hill showing higher sensory than motor paralysis, provides evidence that his spinocain solution was behaving in the same manner as the usual novocain saline solutions.

In what way does the so-called "expansion" differ from "barbotage"? The effect of barbotage is to cause an immediate spread of novocain and a great reduction of the specific gravity compared with that of the original injection. Thus the spread by gravity is very much retarded. If Dr. Hill will try some cases with 10 per cent. novocain normal saline—injecting a series of patients between L1 and L2 with doses graduated from 5–15 cg., and putting the patient at once in the Trendelenburg position—he will, I think, find that the levels reached will vary with the amount of novocain injected.

Splanchnic block is usually obtained by 15 cg. Adult spines vary in length. Measurements in complete flexion between the inter-iliac line and the seventh cervical spine vary as much as three or four inches, and there are other variable factors which sometimes combine to defeat us. I think most people will agree that spinal analgesia results either from a simple nerve-block across the cauda equina, or in the dorsal region from root-block, and I can see nothing in Dr. Hill's argument which disproves this. His theory that the respiratory centre will carry on the breathing after the phrenic nerves have been paralysed is incomplete because he does not state by which line the impulses are carried. My experience leads me to believe that the intercostals are paralysed in high blocks.

On theoretical grounds, therefore, I suggest that the Pitkin method is nothing more than the ordinary method, temporarily obscured by a cloud of "gliadin."

I am, Sir, yours faithfully,

W. HOWARD JONES, M.B., B.S. Lond.

London, W., Jan. 20th, 1930.

INVISIBLE VIRUSES.

To the Editor of THE LANCET.

SIR,—In the October number of *The Realist* there is a very interesting article on invisible viruses by Prof. Boycott. While this affords a useful summary of the principal points known about the characters and behaviour of these viruses, one is left at the end with a distinctly vague and unsatisfactory impression as to their real nature. The reason for this is, I think, Prof. Boycott's inability or unwillingness to recognise that these viruses are most probably ferments or enzymes. As, allowing for one or two apparent contradictions, an analysis of the points and inferences made by Boycott is so suggestive and indicates, in my opinion, so clearly that the only alternative to these viruses being living organisms is their ferment-nature, may I be allowed some comments on his article?

On p. 18 (loc. cit.), Boycott writes:

"Of the fact of multiplication (of these viruses) there can be no doubt, and in face of this it is idle to talk about the possibility of viruses being ferments or enzymes, which *ex hypothesi* do not multiply."

Yet, on the next page (19), he says:

"There is, however, another possibility, suggested by the gap in the chain of evidence where we have no proof that the virus which we get out of an infected animal or plant is directly descended from the virus which we put in. It is conceivable that the virus does something to the host's body and causes it (better, the cell-individuals of which the body is composed) to produce more virus, and that *multiplication is indirect.*"

By this, Boycott undoubtedly means to infer that certain susceptible cells may be stimulated by a relatively minute quantity of the virus serving as the source of the infection to produce of themselves a relatively large amount, and thus give rise to the manifest symptoms of the particular disease. Further, Boycott recognises that, while in several of their properties viruses closely resemble microbes, ferments are affected in much the same way, and, he adds, indeed, that some viruses show a resistance to heat and chemical agents which, for ordinary microbes, would certainly be extremely high. It should be noted, moreover, that Boycott admits there is no reliable evidence that these viruses have been grown in artificial media (i.e., such as contain *no tissue cells* and in which, therefore, the possibility of additional production of the virus by the cells themselves is eliminated). Lastly, on p. 22, Boycott writes:

"If viruses which ferment organic matter to feed upon it were at all common, one would expect that they would have turned up sometimes in ... experiments. If such viruses *really do not exist* (i.e., in the sense that they are independent organisms), it emphasises again their intimate association with live animals and plants, and is concordant with the suggestion that they are *derived from their hosts*" (the italics again, in both cases, are mine).

From Prof. Boycott's own admissions, therefore, does it not seem to follow, rather, that it is at the least very premature to say "of the fact of multiplication there can be no doubt"; and that, on the contrary, it is really idle to *deny* that these viruses may be enzymes? Boycott is quite evidently not satisfied in his own mind that these viruses are living organisms of the usual nature, and he endeavours to surmount this difficulty in a remarkable way. He envisages an intermediate kind of thing—partly living and partly non-living! He adduces in comparison, as a parallel state, certain lowly organisms which possess in some respects animal characteristics and in others vegetable ones. But this is, I think, an entirely misleading comparison. All animals and

plants possess *the essential characteristic* of a living organism—namely, its power to grow and multiply (as Boycott himself agrees, p. 18); in other words, a living thing can produce more of itself by the incorporation and assimilation of less complex organic materials (food), using these to build up its own substance, this increase being followed in due course by division. In a living cell, there are plenty of dead things—inclusions, secretions, excretions, and the like; but these are all as dead as door-nails, so far as their power to increase independently of the living cell is concerned. Further, if, as Boycott admits may be the case, these invisible viruses are derived from ordinary living cells, that very fact would render it highly improbable that they themselves are distinct living entities. In any particular living thing, whether one of the lowliest cell-units, such as a bacterium, or a highly differentiated one, a congeries of which make up the body of a multicellular animal, we have not *the slightest evidence* that, in such a unit, there are contained lesser or simpler elements which subscribe to the definition of life. Indeed, apart from this, one has—a biologist particularly—an instinctive questioning, quite reasonable, as Boycott himself allows, whether it is possible for such minute particles as these invisible alleged organisms to be of sufficient size to contain the large aggregation of coördinated molecules necessary to constitute a unit able to exercise the wonderful functions of life. The *reductio ad absurdum* to which this "parasitic" view—as, essentially, it would be—would lead us is well shown by a consideration of Gye's theory about cancer, which implies that nearly all the cells of our body contain, normally, the invisible cancer-organism, a "foreign," intracellular, living element, which is only biding its time until the stimulation of some auxetic or adjuvant wakes it into activity! Even Boycott thinks this is an extremely unlikely idea.

And Boycott's own explanation is, I am afraid, equally improbable. The pity of it is that he does not see where many of his thoughtful and reasonable inferences inevitably lead! In these admittedly difficult cases, where we are dealing with minute quantities of substances which we cannot see, it is pertinent to bear in mind one of the essential postulates in connexion with the *vera causa* of the old logicians. Is the explanation reasonable, is it likely?

Now it so happens that I myself have devoted a considerable amount of research to this question and have come to the conclusion that the virus-diseases, and also malignant growths, are caused by non-living agents of the nature of ferments or enzymes, produced by the cells. As a matter of fact, I was the first to suggest this view and to bring forward, during a period of over five years, many observations and sustained arguments in favour of a comprehensive theory in explanation of the same. From the very first (1921) my view, in so far as the question of the transmissible property of the virus-diseases is concerned, was rendered, in my opinion, logically tenable by the very case which Boycott himself cites—namely, that of the bacteriophage of Twort-d'Herelle, which I regarded as an entirely comparable phenomenon. With regard to this, also, Boycott adopts a somewhat non-committal attitude. He merely says:

> "There are reasons for supposing that this agent arises in the bacteria themselves; . . . but the data are not conclusively against d'Herelle's view that it is really an independent parasite."

I believe the great majority of bacteriologists are agreed that this agent is a lytic ferment—even although this is not conclusively proved. In the case of virus-diseases, my theory assumes that the character of the normal blood-digestive enzyme has been altered by reason of the faulty vital activity of the cell, this pathological derangement having been induced at the outset by the infection with the virus—i.e., that particular modification of the normal enzyme in question. And it is very gratifying to see how Boycott is led to inferences which I have already drawn in certain of my papers. For instance, when considering the possibility that "fresh" virus may be made by each infected person or animal, he says that it is just possible that such diseases (he instances measles or distemper) were originally brought into existence by causes quite different from those which now maintain them. Similarly, I consider that these viruses have probably originated autogenetically, the pathological hæmetaboly having been induced in the first place by some outside cause, such as, in some cases, a very unusual manifestation or syndrome associated with an ordinary bacterial infection.[1] I may just mention two interesting possible examples, in a transitional phase, as it were, that is, developing at the present time, though these are still admittedly little more than speculations or notions, as Boycott puts it. They are encephalitis lethargica, and the virulent, devastating type of influenza; but here, too, lack of space precludes any consideration of them. Again, Boycott admits that if these viruses are the product of abnormal cell-activity, having once arisen, it is by no means impossible that some can arise *de novo*, nowadays, given the necessary conditions. (This is a very different thing, it must be borne in mind, from the creation of a new living organism, apart from an existing one!) And, indeed, as regards at least one type of stabilised, regular virus (if I may so put it), namely, typhus and its congener, trench-fever, the fresh origin of such virus by pathological hæmetaboly in its primary host, the louse, is, I venture to say, very much more than a mere possibility.

Just because it is so apparent from Boycott's article that the only alternative to a causal organism in the case of the virus-diseases and of cancer is a ferment, and because I was the first to put forward this view, as a result of my own work on the important function of normal blood-digestion and its various derangements, I have thought it worth while to trespass on your space.

I am, Sir, yours faithfully,

H. M. WOODCOCK.

Walton-on-Thames, Jan. 14th, 1930.

TESTS FOR MOTOR-DRIVERS.

To the Editor of THE LANCET.

SIR,—It is surely essential that a motor-driver should not be given a licence to drive till he has furnished a certificate that he is free from such a grave disability as to render him totally unfit to be a chauffeur. There are many men with very defective vision in one eye or partially deaf who are unaware of the fact, and many others who will not admit the defect.

The Road Traffic Bill, as amended in Committee (Clause 5, p. 6), accepts the applicant's *declaration* as to freedom from disability. In the interests of humanity, and for the safety of the public, I suggest that some *test* (neither severe nor expensive) should be insisted on for every applicant for a licence to drive a motor. A simple form might be filled in and signed by a doctor at a modified fee, paid by the applicant. The amount of the fee might be settled by the State. A re-examination and certificate need not be annual.

As one of the delegates I raised this point at the Conference on Street Accidents, convened by the Minister of Transport on Jan. 14th and 15th, which was supported by Mr. A. Hume Nicholl, Chairman of the London "Safety First" Council. The only arguments advanced against a test were on the score of expense and impracticability.

I am, Sir, yours faithfully,

D. A. COLES,
Chairman of Council of Industrial Medicine; Vice-Chairman of London "Safety First" Council.

Beckton-gardens, E., Jan. 17th, 1930.

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[1] And, ultimately, it should be added, cellular autolysis, which is probably, in most cases, the end-result as regards the affected cells.

MUTILATING OPERATIONS.

To the Editor of THE LANCET.

SIR,—Having witnessed the circumcision of an infant of humble Jewish parentage many years since, the correspondence under the above title has interested me. In order to ascertain the details of the present manner in which the rite of circumcision is performed, I consulted a high authority on the subject, and his description, which I now quote, differs only from that at which I was present in the absence of antiseptic measures.

"The rite is not performed by a priest; the official is called the mohel, and he is always licensed by the Jewish authorities. It is always a particular kind of surgical knife which is used and is very sharp. The mohel with the wine in his mouth exerts suction when he takes the penis into his mouth; this is to draw blood, and it is usually done several times. But the actual stopping of the bleeding is by means of some astringent powder, or this mixture: sulphuric acid, 1 part; alcohol, 3 parts; honey, 2 parts; vinegar, 6 parts. The mohel is supposed to wash his hands in a solution of bichloride of mercury beforehand."

My friend states in a postscript: "Scriptural sanction exists for the rite only; its performance, —i.e., the details—is not mentioned; they have been gradually adopted."

I am, Sir, yours faithfully,

CHARLES W. CHAPMAN.

Wimpole-street, W., Jan. 16th, 1930.

COMPULSORY TREATMENT OF VENEREAL DISEASE.

To the Editor of THE LANCET.

SIR,—On behalf of the Executive Committee of the British Social Hygiene Council I should like to make clear the position of the Council in regard to the question of compulsory treatment of venereal disease, as certain of the remarks made by Dr. Sequeira in his letter published in your issue of Jan. 18th may give rise to misunderstanding. The Council holds no brief either for or against compulsory treatment of venereal disease. At its meeting on June 13th, 1923, it accepted the report of the Committee of Inquiry on Venereal Disease presided over by Lord Trevethin "as a document that can bring together all persons of goodwill in efforts to reduce venereal diseases." The report contains the following references to venereal disease:—

"We think that in the present state of public opinion any system of general compulsory notification of venereal disease would tend to concealment, and would prove a backward step."

"Notwithstanding what we have said above we are of opinion that it may well be that in certain areas special measures for the prevention of venereal disease would be justifiable, for example, measures for dealing with defaulters .....and we think that local health authorities who are able to make to the Ministry of Health a special case for some such special measure should be allowed, at any rate for some limited period, by way of experiment to carry out the measures they propose under the present system by which a contribution towards the expenses is made by the State. In this way there may ultimately be built up a body of experience of great value in determining future policy."

The position adopted by the Council was reaffirmed in the following resolutions passed at the meeting of Council held on July 5th, 1928:—

"The Executive Committee have received the information as to the Edinburgh Corporation Provisional Order, and in their view it comes under the conditions for experimental areas as suggested in the report of the Trevethin Committee, and in that sense they propose to watch the experiment with care, and do not propose to take any action";

and at the meeting of the Executive Committee held on December 2nd, 1929:—

"The Executive Committee recommend that in pursuance of the decision previously taken upon the Trevethin report, the Council should take note of the possible action of the Scottish local authorities in seeking additional powers for the treatment of venereal diseases, such powers to be for a limited time, and of an experimental nature."

I am, Sir, yours faithfully,

E. O. GRANT,
Secretary, British Social Hygiene Council.

Carteret House, Carteret-street, S.W., Jan. 21st, 1930.

THE FIRST ASYLUMS RESEARCH LABORATORY.

To the Editor of THE LANCET.

SIR,—With reference to the statement made by your Scottish correspondent in your issue of Dec. 14th, 1929, and Dr. Douglas McRae's support thereof, and with every respect and admiration for the Scottish effort in 1898, the claim to be first in the field cannot be sustained. The research laboratories of the London County Mental Hospitals, subserving the purposes of nine mental hospitals, accommodating 16,000 patients, came into existence in 1895.

I am, Sir, yours faithfully,

JOHN R. LORD,
Editor, "Mott Memorial Volume."

Epsom, Surrey, Jan. 20th, 1930.

To the Editor of THE LANCET.

SIR,—An annotation in your issue of Jan. 18th, entitled the First Asylums Research Laboratory, claims this title for the laboratory opened in Edinburgh in 1898. It may be of interest to point out that the Central Pathological Laboratory of the London County Council Mental Hospitals Department was established under the directorship of the late Sir Frederick Mott in 1895. It owed its inception to the report of a medical subcommittee of the London County Council, made in 1893, whose recommendation for the appointment of one pathologist of standing and position for the London Mental Hospital Service found a very vigorous advocate in Sir William J. Collins, the chairman of the subcommittee. It was decided to establish a central laboratory and museum at Claybury Mental Hospital, at that time only just finished. It was not until 1916 that the laboratory was removed from Claybury to the Maudsley Hospital. A member of the original staff recruited by Sir Frederick Mott in 1895, Mr. C. Geary, is still working in the laboratory.

I am, Sir, yours faithfully,

F. GOLLA,
Director, London County Council Mental Hospitals Department, Central Pathological Laboratory.

Denmark Hill, S.E., Jan. 21st, 1930.

THE LATE SCARE IN BRIGHTON.

To the Editor of THE LANCET.

SIR,—I think it should be known among gentlemen of the medical profession who often send their patients here that there have been no further cases of illness in Brighton and Hove as a result of what has been called the "sore-throat scare." I have the personal assurance of the Medical Officers of Health concerned, Dr. A. Griffith, of Hove, and Dr. Rutherford Cramp, that no cases have come under their notice since the end of last year. The cause, as you may know, was traced to a certain milk-supply in a particular part of the county, which was fortunately traced to its source, the supplies stopped, and the danger removed. In no case, so far as it was possible to ascertain, was there any illness in the hotels, and this at a time when they were full to overflowing on account of the Christmas holidays.

I am, Sir, yours faithfully,

FRANK EVANS,
Chairman, Brighton and Hove Hotels and Restaurants Association.

Jan. 21st, 1930.

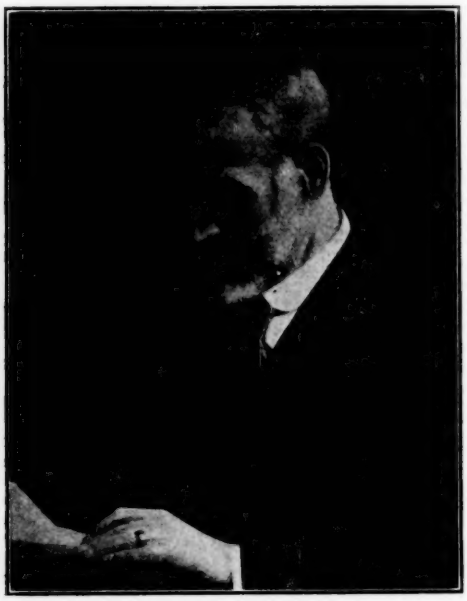
Obituary.

GEORGE DANCER THANE, F.R.C.S. ENG., LL.D., D.SC.,

EMERITUS PROFESSOR OF ANATOMY, UNIVERSITY COLLEGE, LONDON.

WE regret to record the death, which occurred on Tuesday, Jan. 14th, at his house in Harrow, of Sir George Thane, the best-known exponent, by teaching and writing, of anatomy on what may be termed the older lines of thought and direction.

George Dancer Thane was born in 1850, the son of Dr. G. D. Thane, a medical practitioner of Great Berkhamsted, and received his education at



SIR GEORGE THANE.

[*Photograph by Lafayette.*

University College, London, and the medical school of University College Hospital. He took the diploma of M.R.C.S. in 1871, but had already manifested his disposition towards the study of anatomy, for in the previous year he had been appointed demonstrator of anatomy to George Viner Ellis, then professor in the school. The story, accordingly, of Thane's connexion with anatomy and University College is one of curiously direct ancestry. Ellis himself, five and thirty years before, after a successful career as a student, had become demonstrator of anatomy at the College under the first Professor of the subject, Richard Quain. In 1850 Ellis succeeded Quain in the chair, and held the appointment for 27 years, resigning in 1877 to give way to his own competent assistant Thane, who occupied the post for 40 years, being appointed Emeritus Professor in 1919.

The life-work of all three great anatomists is summarised in successive volumes of Quain's Anatomy, two editions of which Ellis edited in coöperation with the famous Sharpey, while Thane was responsible for the purely anatomical portions of the later issues, besides editing Ellis's smaller volume in more than one of its issues. The same powers of description which Thane displayed in his written work were evident in his lectures, and he infused into the cold exact teaching of Ellis qualities of interest which proved of great value to students. His knowledge and, alike, his sympathy with learners was proved by his frequent appointment as an examiner, for in this capacity he acted for the Universities of Oxford, Cambridge, London, Manchester, Liverpool, Leeds, and Wales, as well as at the English Royal Colleges. He was for a long period Inspector of Anatomy for England and Wales, and gradually acquired as high a reputation abroad as he enjoyed at home, for he was elected an honorary member of academies and associations in Germany, France, and Sweden. He discharged his duties as Inspector of Anatomy with great discretion, being informed by an accurate familiarity with what were the directions in which, at any particular time, a research was pertinent to the advancement of science. In 1896 he became President of the Anatomical Society of Great Britain and Ireland, and long after he had passed the chair he was a regular attendant at the meetings, where his juniors by common assent accorded him the place of leadership. To one such junior we owe the following appreciation of him:—

"Sir George Thane might be described, perhaps, as the last of the 'Old Guard' in the anatomical forces of this country. To the younger generation of anatomists he was little more than a highly respected name, and even among the leaders there are not many who can recall him as he was in the heyday of his powers—nor need we be astonished at this when we realise that he reached his professorial chair more than half a century ago, and that 34 years have elapsed since he was elected President of the Anatomical Society. He attended the meetings of this Society for years after holding the office, but his visits grew gradually less frequent, and for a long period he had not been seen among his former colleagues. A man of encyclopædic information, he held as high a place in international repute as in his own country. He was one of the British representatives at the quasi-international conference at Basle, from which the B.N.A. emanated, and his last appearance at an ordinary meeting of the Anatomical Society was an occasion for discovering his rich humour in the speech he made against that terminology. He edited Ellis' Anatomy, and for many years was responsible for the purely anatomical volumes of 'Quain.' Here his power of lucid description, combined with brevity and informed by his extensive knowledge, made the successive issues examples of what may be done with books of reference. The accuracy of his information was unimpeachable, and to say that 'Thane says so' was enough to put a statement on a firm basis without much further effort. An anatomist of the old school, Sir George Thane was always receptive of changing views during his active life, and always eager to hear new things. He was not lacking in words of encouragement for his younger colleagues, and, although he knew how to maintain respect for his calling when in his chair, he was ever ready to hear the views of others, and to give advice and counsel on the problems which beset them. He was an important figure among the anatomists of the nineteenth century, one who had the affections of many, and—even at his advanced age and after years of retirement—his passing will be a sorrow to all who had had the privilege of knowing him."

Thane's position was recognised publicly by such honours as the F.R.C.S.Eng. by election, the LL.D. Edin., and the D.Sc.Dub., while abroad he received similar acknowledgements of his reputation. In 1919, on his retirement from the active professorship at University College, he was created a knight.

A former demonstrator writes: "It may be of interest to record something of the work done by Sir George Thane at University College as a teacher of medical students for so many years. Before he became professor he had for rather more than six years been demonstrator under Prof. Ellis, and when he became Professor, he left the work in the dissecting room to his demonstrators and was rarely seen there. His teaching centred round the daily lecture at 12 o'clock. To the last he took great pains with this lecture, and, in spite of advancing years, never seemed to tire of it and always brought to it enthusiasm and freshness of outlook. An hour or more prior to the

lecture was invariably spent in the theatre arranging the specimens and drawing on the blackboard. These drawings were largely diagrammatic, but at times real works of art, and tended perhaps in the course of years to be over elaborate. It was no uncommon sight to see enthusiastic students staying behind or returning later to make copies of the diagrams. The lecture was delivered fluently, rather fast, but was always lucid and dogmatic in the sense that there was no doubt in Thane's mind as to what he wanted to say and no ambiguity in expressing it. Thane made a great point of knowing his students personally, and to this end he met the first-year students every Wednesday at 2 P.M. and taught them the bones. This class, as taken by him, was never dull, and students attending it learned, perhaps unconsciously, much more than how to place a bone; for Thane made use of the class to teach the individual students not only how to observe, but how to reason correctly from the observation. In a similar way he met the second-year students once a week for a demonstration and viva voce examination on the soft parts. Countless medical men will remember Sir George Thane, not only as one who gave them of his best as a teacher of anatomy at University College, but as a sympathetic friend who was always ready to help and advise them in their student days."

In 1884 Sir George Thane married, at Stockholm, Jenny, elder daughter of Augustus Klingberg of that city, and is survived by her and two daughters.

A memorial service was held on Jan. 17th, in St. Pancras Church, and was largely attended by representatives of public bodies with which Sir George Thane was connected, and by scientific representatives. On the same day an assembly of the Faculty of Science of University College and of representatives of the medical school of University College Hospital was held at the College, when the professor of anatomy, Dr. Elliot Smith, Sir John Rose Bradford, and Mr. Percy Flemming spoke of the great qualities of their dead leader.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

RE-ASSEMBLY OF PARLIAMENT.

BOTH Houses of Parliament re-assembled on Tuesday, Jan. 21st, after the Christmas recess.

The Medical Committee of the House of Commons will meet on Tuesday of next week to discuss the Mental Treatment Bill which has already passed through the House of Lords and is expected to come before the House of Commons shortly. The Medical Committee hope to have the advantage of the presence at their meeting of Sir Hubert Bond, a Commissioner of the Board of Control. On the following day there will be a meeting of the Unionist Health and Housing Committee, which will be presided over by Lieut.-Colonel Fremantle.

HOUSE OF COMMONS.

TUESDAY, JAN. 21ST.

Royal Veterinary College.

Captain CROOKSHANK asked the Minister of Agriculture if he could make any statement regarding the report on the Royal Veterinary College.—Mr. BUXTON replied: I am fully aware of the need for urgency in this matter, and discussions between the Government departments and other bodies concerned are being pressed forward. I am not in a position to make any further statement on this subject, but the hon. Member may rest assured that a decision will be reached and made public as soon as possible.

Dried Condensed Milk from Abroad.

Mr. OSWALD LEWIS asked the President of the Board of Trade the quantity of dried condensed skimmed milk imported from abroad in each of the last three years.—Mr. W. GRAHAM replied: The particulars available in respect of imports of milk powder in the years 1927 and 1928 were stated on Dec. 16th last. The quantity recorded for the year 1929 was 279,463 cwt., including 16,475 cwt. of sweetened milk powder. These quantities for 1929 are inclusive of milk powder to which other matter than sugar has been added (not less than 70 per cent. being dried milk). The figures for earlier years did not include such products with milk powder. No information is available to show what proportion of the imported milk powder was prepared from skimmed milk.

Replying to Mr. HANNON, Mr. Graham said that within his knowledge no complaints had been made to the Board of Trade of the spread of tuberculosis in this country consequent on the import of skimmed milk.

Slum Clearance Legislation.

Sir KINGSLEY WOOD asked the Prime Minister what facilities he proposed to afford for slum-clearance legislation.—Mr. MACDONALD replied: It is hoped that the Bill may be introduced at an early date.

Government and Vaccination Laws.

Mr. FREEMAN asked the Minister of Health whether he could announce his intentions as to any proposed amendment of the law relating to the Vaccination Acts.—Miss SUSAN LAWRENCE replied: No, Sir. My right hon. friend has nothing to add to the answer given on Dec. 12th.

Appointment of a Surgeon in Caithness.

Sir ARCHIBALD SINCLAIR asked the Secretary of State for Scotland whether he could announce his decision with regard to the appointment of a residential surgeon for the Bignold and Dunbar hospitals in Caithness.—Mr. ADAMSON replied: The question of assistance from the Highlands and Islands (Medical Service) Fund towards the appointment of a surgeon in Caithness was brought before the Department of Health for Scotland some time ago by the managers of the Dunbar Hospital, but, in the absence of any indication from the managers of the Bignold Hospital that they desire such an appointment, the Department have not yet been able to deal with the matter. I can assure the hon. baronet that any application that has the support of both bodies will receive the sympathetic consideration of the Department.

Medical News.

ROYAL SOCIETY: FOULERTON RESEARCH SCHOLARSHIP.—The President and Council of the Royal Society have awarded the Foulerton research studentship to Mr. A. S. Parkes, D.Sc., who at present holds a Senior Beit Research Fellowship. Dr. Parkes is working in the department of Physiology and Biochemistry, at University College, London. The Fellowship is rendered vacant by the appointment of Mr. R. J. Ludford, D.Sc., to a senior post on the staff of the Imperial Cancer Research Fund.

"BRUXELLES-MÉDICAL" CRUISE.—The annual cruise which is organised by the *Bruxelles-Médical* will this year take the form of a voyage from Bordeaux to Marseilles and will include calls at the ports of Leixoes (Porto), Cadiz, Tangiers, Valetta, Syracuse, Taormina, Palermo, and Naples, the return journey being made along the east coast of Corsica. The *Cap Varella*, of 14,000 tons, belonging to the Indo-China steamship line, which has been specially built for crossings in warm seas, will leave Bordeaux on July 12th, and will reach Marseilles on the 28th of the same month. Excursions will be organised at every port of call. Medical men taking part in the cruise, their wives and unmarried children, can travel first-class at a minimum charge of £27 5*s.* or second-class £11 16*s.* Passengers who do not belong to the medical profession, but who are recommended to take the trip by their family doctor, may join the party at modified prices. Further particulars can be obtained from the Section des Voyages de Bruxelles-Médical, 29, Boulevard Adolphe Max, Brussels.

EXTENSION OF HOPE HOSPITAL, PENDLETON.—Last week Mr. J. A. Webb, Chairman of the Salford Board of Guardians, laid the foundation-stone of a large extension of this hospital, which is administered by the board. The new building will contain 256 beds and will cost £136,000. This enlargement is an instalment of a scheme for providing 512 beds for acute surgical cases and a separate children's hospital. When completed the proposed building, in conjunction with the existing infirmary, will afford accommodation for more than 1500 patients.

THE WORK OF MEDICAL WOMEN IN INDIA.—A discussion on this subject will be opened by Lady Barrett on Tuesday, Jan. 28th, at 8.30 P.M., under the auspices of the London Association of the Medical Women's Federation. The meeting will be held at the British Medical Association House, Tavistock-square, and will be open to anyone interested in the problem of medical work in India.

MEMORIAL TO A MEDICAL MAN.—A bed in the Birmingham and Midland Hospital for Women has been named in memory of Dr. William Cook, of Water Orton.

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.—With the aid of a bank loan of £15,000 the cost of the recent removal and rebuilding, amounting to £140,000, has now been defrayed. When the overdraft is redeemed the hospital will be free from debt and paying its way.

BENEFACTORS TO THE VICTORIA HOSPITAL FOR CHILDREN.—Sir Percy Shepherd recently set in motion a lift in the nurses' home attached to this Chelsea hospital, which has been provided by the Shepherd Trustees in memory of the late Mr. William Shepherd. On the same occasion Mrs. Ernest Farquhar unveiled a tablet to the memory of the late Mr. Alfred Farquhar, for 40 years treasurer of the hospital.

GLASGOW HOSPITALS COLLECTION.—The Charity Day Collection organised by Glasgow students in aid of the local hospitals reached the sum of £17,263, being £263 more than last year, and has thus surpassed all previous records. The students have now collected in ten years £104,663 for the city hospitals.

NORTHAMPTON COUNTY MENTAL HOSPITAL.—It has been decided to extend this hospital at Berry Wood at an estimated cost of £90,000. The extension will provide a reception block for 60 patients, a male convalescent house for 15 patients, a female nurses' home to accommodate 60, and a tuberculosis block for 10 female patients. At present the hospital has nominal accommodation for 967 patients and is housing 1013.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, Jan. 27th.—8 P.M., ODONTOLOGY. Papers: Prof. W. Billington and Mr. Harold Round: (1) Bone-grafting the Mandible; Some Recent Results. (2) A Two-stage Cleft Palate Operation. (Illustrative cases will be shown.)

TUESDAY.—5 P.M., MEDICINE. Short Papers: Dr. Otto Leyton: Nine Cases of Recovery from Diabetes Mellitus. Dr. A. P. Thomson: Further Observations on Psittacosis.

THURSDAY.—8.30 P.M., HISTORY OF MEDICINE. Reception at the Wellcome Historical Medical Museum, Wigmore-street, London, W.1. Short Address: Dr. A. P. Cawadias: From Epidaurus to Galen: The Principal Currents of Greek Medical Thought. Mr. L. W. G. Malcolm will demonstrate some recent acquisitions to the Museum.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, Jan. 27th.—8.30 P.M., Prof. David P. D. Wilkie, of Edinburgh, will open a Discussion on The Ætiology of Gall-bladder Infections.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.

FRIDAY, Jan. 31st.—8.30 P.M., General Meeting. A Paper will be read by Col. E. T. Burke on the Treatment of Wassermann-fast Syphilis. A discussion will follow.

HUNTERIAN SOCIETY.

MONDAY, Jan. 27th.—9 P.M. (at the Mansion House) Dr. Gustave Monod: Immunity from a New Point of View. (Hunterian Lecture.) The Annual Dinner will be held at the May Fair Hotel, Berkeley-street, W., on Thursday, February 13th.

LONDON CLINICAL SOCIETY.

TUESDAY, Jan. 28th.—8.45 P.M. (at the London Temperance Hospital). Dr. Hurst and Mr. Souttar will open a Discussion on the Treatment of Gastric Ulcer.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn, W.C. (Hunterian Lectures.)

MONDAY, Jan. 27th.—5 P.M., Prof. Victor Bonney: Surgical Treatment of Carcinoma of the Cervix.

WEDNESDAY.—5 P.M., Prof. G. E. Gask: Treatment of Epithelioma of the Tongue by Radium.

FRIDAY.—5 P.M., Prof. W. Sampson Handley: The Papilloma and its Menace.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Jan. 27th, to SATURDAY, Feb. 1st.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Tues., 4 P.M., Cinematograph Demonstration by Mr. P. Lockhart-Mummery on Perineal Excision of Rectal Cancer. No fee.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E.1. Thurs. 30th, 2 P.M., Demonstration by Mr. St. J. D. Buxton. No fee.—ROYAL NORTHERN HOSPITAL, Holloway-road, N., Fri. 2.30 P.M., Demonstration of Medical Cases by Dr. Bruce Williamson. No fee.—NORTH-EAST LONDON POST-GRADUATE COLLEGE (Prince of Wales's General Hospital), Tottenham, N. Intensive Course in Medicine, Surgery, and the Specialties, lasting two weeks. Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, Jan. 27th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases. Clinics. Operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

MONDAY, Jan. 27th.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Sinclair: Surgical Wards.

TUESDAY.—10 A.M., Medical Registrar: Medical Wards. 2 P.M., Mr. Hamblen Thomas: Throat, Nose, and Ear Dept. 2.30 P.M., Sir Henry Simson: Gynæcological Operations.

WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards. Dr. Scott Pinchin: Medical Out-patients.

THURSDAY.—11.30 A.M., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department.

FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Department, 2 P.M., Mr. Sinclair: Operations.

SATURDAY, Feb. 1st.—9 A.M., Mr. Vlasto: Throat, Nose, and Ear Operations. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Children's Department.

Daily, 10 A.M. to 5 P.M., Medical, Surgical and Special Out-patients, Operations, Ward Visits, Anæsthetic Courses.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, Jan. 28th.—5 P.M., Dr. W. J. O'Donovan Exfoliative Dermatitis.

THURSDAY.—5 P.M., Dr. H. Haldin-Davis: Pruritus. Prurigo. Lichenification.

UNIVERSITY COLLEGE, Gower-street, W.C.

MONDAY, Jan. 27th.—5 P.M., Prof. A. V. Hill: Oxygen and the Recovery Process in Muscle and Nerve. (Second of four public lectures.)

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.

THURSDAY, Jan. 30th.—9 P.M., Dr. E. ff. Creed: Indications for Blood Transfusion.

ROYAL NORTHERN HOSPITAL, Holloway.

TUESDAY, Jan. 28th.—3.15 P.M., Mr. N. A. Jory: Obstruction of the Œsophagus.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL.

FRIDAY, Jan. 31st.—4 P.M., Mr. W. A. Mill: Complications of Acute Mastoiditis.

ST. MARY'S HOSPITALS, Manchester.

FRIDAY, Jan. 31st.—4.30 P.M., Post-graduate Lecture (at the Whitworth-street West Branch). Dr. J. W. Bride: Methods of Examination in Obstetric Practice.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY, Jan. 29th.—4.15 P.M. (at the Eye Infirmary). Dr. Barbour Stewart and Dr. John Marshall: Eye Cases.

Appointments.

BROWN, C. M., M.B., Ch.B. Glasg., has been appointed Asst. Medical Officer of Health for the County of Leicester.

HAMILTON, MARGARET C. P., M.B. Ch.B. Glasg., Resident Physician at Craw-road Institution, Paisley.

KERR, J. A., M.D., Ch.B. Glasg., D.P.H., Asst. Medical Officer of Health for Birmingham.

LEWIS, I., L.R.C.P. Lond., M.R.C.S., Medical Officer for the Pwllheli Union.

WILLIAMS, G. C., L.R.C.P. Lond., M.R.C.S., D.P.H., Medical Officer of Health for Oxford.

Vacancies.

For further information refer to the advertisement columns.

Accrington, Victoria Hospital.—H.S. £150.
Barnsley, Beckett Hospital and Dispensary.—Jun. H.S. £140.
Beverley, Yorkshire, East Riding Mental Hospital.—Jun. Asst. M.O. £250.
Birmingham, City Hospital for Infectious Diseases, Little Bromwich.—Sixth Asst. M.O. £300.
Bolton, Townleys Hospital, Farnworth.—2nd Asst. M.O. £225.
Bootle Borough Hospital.—Sen. Res. M.O., and Two Jun. H.S.'s. At rate of £200 and £125 respectively.
Bradford Royal Infirmary.—Two H.S.'s. Each at rate of £150.
Brighton, Sussex Eye Hospital.—Hon. Clin. Asst. to Out-patients.
Bristol General Hospital.—Sen. Res. M.O. £200.
Bristol Royal Infirmary.—H.P.'s and H.S.'s, &c. Each at rate of £60. Cas. H.S. and Dental H.S. Each at rate of £80.
Bury St. Edmunds, West Suffolk General Hospital.—H.S. At rate of £150.
Buxton, Devonshire Hospital.—Asst. H.P. At rate of £150.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Out-patient Statistical Registrar. First Asst. to Out-patients. Also Res. H.S. At rate of £75.
Central London Ophthalmic Hospital, Judd-street, W.C.—Asst. S.
Chemsford, County Council of Essex and U.D.C. of Chingford.—Asst. County M.O.H., &c. £800.
Chester Royal Infirmary.—H.P. £150.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Coventry City.—Asst. School M.O. and Asst. M.O.H. £600. Also Deputy M.O.H. £750.
Derby, Derbyshire Hospital for Sick Children.—Res. M.O. At rate of £150.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Surgeon to Nose, Throat, and Ear Dept.
Evelina Hospital for Children, Southwark, S.E.—H.P. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £150.
French Hospital and Dispensary, 172, Shaftesbury-avenue, W.C.—Hon. Asst. Dental S.
Hemel Hempstead, West Herts Hospital.—Sen. Res. M.O. Also Jun. Res. M.O. £150 and £100 respectively.
Ilford King George Hospital.—Second H.S. At rate of £100.
Infants Hospital, Vincent-square, Westminster.—H.P. At rate of £75.
Indian State Railways.—Dist. M.O. Rs. 650 per mensem.
Ipswich, East Suffolk and Ipswich Hospital.—Cas. O. £150.
Leicester City Isolation Hospital and Sanatorium.—Res. M.O. £300.
Liverpool, Broadgreen Sanatorium.—Asst. Res. M.O. £250.
Liverpool Eye and Ear Infirmary.—H.S. to Ear, Nose, and Throat Dept. £100.
Liverpool Psychotherapeutic Clinic, 56, Bedford-street.—Asst. Hon. P.
Liverpool, Seamen's Dispensary.—Part time Temp. Asst. Venereal Dis. M.O. £250.
Liverpool University.—Hon. Lecturer in Laryngology.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
Macclesfield General Infirmary.—2nd H.S. At rate of £150.
Manchester, Ancoats Hospital.—Asst. Pathologist. £350. Also Res. M.O. £150.
Manchester Royal Infirmary.—Dickinson Scholarships, Research Travelling Scholarship in Medicine. £300. Also Pathology Scholarship. £75.
Manor House Hospital, Golders Green, N.W.—H.S. At rate of £200.
Margate, Royal Sea Bathing Hospital for Surgical Tuberculosis.—Radiologist. 100 gns.
Metropolitan Hospital, Kingsland-road, E.—Ophth. Surg. Also Asst. Surg. in Dept. for Dis. of Women.
National Hospital, Queen-square, W.C.—Hon. Dental Surgeon.
Newark General Hospital.—Res. H.S. At rate of £150.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Six Jun. Surg. Regs. Each £150.
Northern Rhodesia, Roan Antelope Copper Mines, Ltd.—Jun. M.O. £900–£1000.
Norwood and District Cottage Hospital, Upper Norwood, S.E.—Hon. Anæsthetist.
Rochdale Infirmary and Dispensary.—Jun. H.S. £175.
Royal Society of Medicine.—Nichols Prize.
St. Bartholomew's Hospital, E.C.—Asst. Physician.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—H.S. At rate of £75.
St. Mary's Hospital, W.—Second Asst. Pathologist. £250.
St. Thomas's Hospital Medical School, S.E.—Lecturer in Physiology. £500.
Salford Royal Hospital.—H.S. At rate of £125.
Sheffield Royal Hospital.—Ophth. H.S. Also Res. Anæsthetist. At rate of £80. Also Two Hon. Clin. Assts.
Sheffield Royal Infirmary.—H.S., Ophth. H.S., Asst. Ophth. H.S., Also Asst. Cas. O. Each at rate of £80.
Stoke-on-Trent City Education Committee.—Asst. School M.O. £500.
Sudan Medical Service.—M.O. £E720.
Swindon, Wilts, Great Western Railway Hospital.—Asst. Surg. £800.
Swindon, Wilts, G.W.R. Medical Fund Society.—Asst. M.O. £700.
Taunton and Somerset Hospital.—Jun. House M.O. At rate of £100.
Tiverton Hospital, Devonshire.—H.S. at rate of £100.
Warrington Infirmary and Dispensary.—Jun. H.S. At rate of £175.
West Sussex County Council and Bognor Regis U.D.C.—Asst. County and District M.O.H. £700.
Wolverhampton Royal Hospital.—H.P. At rate of £150.
Wrexham and East Denbighshire War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.

The Chief Inspector of Factories, Home Office, S.W., announces vacancies for Certifying Factory Surgeons at Bury (Lancs.), Builth (Brecon), and Christchurch (Hants.).

The Home Secretary gives notice of a vacancy for a Specialist Medical Referee under the Workmen's Compensation Act for Ophthalmic cases arising in the Districts of the Accrington, Blackburn and Clitheroe, Blackpool, Chorley, Lancaster, and Preston County Courts. Applications should reach the Private Secretary, Home Office, Whitehall, London, S.W., not later than Feb. 8th.

Births, Marriages, and Deaths.

BIRTHS.

BROWN.—On Jan. 13th, at Clonmel, Manor-road, Cheam, the wife of C. Carron Brown, M.D., of a son.

BUCKLEY.—On Dec. 16th, 1929, at Kasauli, India, the wife of Major C. D. M. Buckley, R.A.M.C., of a son.

LUKER.—On Jan. 18th, at a nursing home in London, the wife of S. Gordon Luker, M.D., F.R.C.S., of Latchmoor, Canford Cliffs, Bournemouth, of a daughter.

SHAW.—On Jan. 17th, at Inverleith-place, Edinburgh, the wife of J. J. M. Shaw, F.R.C.S., of a daughter.

MARRIAGES.

HENDERSON—HUNTER-ORR.—On Jan. 18th, at St. Columba's, Pont-street, London, Archibald Henderson, M.B., Ch.B., to Francis Dorothy, daughter of the late Mr. P. Hunter-Orr, Solicitor, Glasgow, and Mrs. Hunter-Orr, 64, Prince's-gate, London.

DEATHS.

COUTTS.—On Jan. 18th, at Golders Green, Lt.-Colonel George Coutts, R.A.M.C. (retired), aged 75.

FOX.—On Jan. 12th, at St. James's-square, Bath, Arthur Edward Wellington Fox, M.B., F.R.C.P. Edin., aged 85.

TAYLOR.—On Jan. 17th, in London, suddenly, William Macrae Taylor, T.D., M.B., C.M., F.R.C.P. and F.R.C.S. (Edin.), Melville-street, Edinburgh.

YOUNG.—On Jan. 13th, suddenly, at Shadwell, Edith Louisa Young, M.D., daughter of the late Samuel Young, and formerly Medical Officer at the Rahmatpur Mission Hospital, Palwal, aged 52.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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Notes, Comments, and Abstracts.

THE HISTOLOGICAL BASIS OF HEALTH.*

I. The Tissues in Youth and Old Age.

By Prof. J. BOEKE,

DIRECTOR OF THE LABORATORY OF EMBRYOLOGY AND HISTOLOGY OF THE UNIVERSITY OF UTRECHT, HOLLAND.

THE title of these lectures may seem at first sight a rather poor attempt to bring together two very widely separated branches of science—histology, which is the study of the morphological units of the living body, the cells and their differentiations, and the science of health, which is the study of what we have to do to secure this most precious gift of heaven. Yet the cause of health lies in the normal functioning of the different parts of the body. The localisation of the changes which accompany or cause physiological activity in the ultimate units of the body is one of the fundamental problems of physiology. We can only understand the functions of the living body if we always try to study the cell in the first place from a purely physiological standpoint. I cannot agree with Heidenhain when he says that the histologist has to remain purely and entirely morphological in his deductions, and that the question of the function and physiological value of a particular histological detail must be kept rigidly outside his range of reasoning and deduction. When Goebel said: "Morphologisch ist das, was sich physiologisch noch nicht verstehen lässt," it is, of course, true that he left vast areas of comparative anatomy outside his scope of vision, but he is absolutely right when he maintains that a morphologist always has to try to answer the question: What is the physiological meaning of the particular histological detail he is studying? We have a right to say that we understand a morphological detail only when we can connect it with a distinct physiological function, even if we can only connect it in the general sense of a harmony between the different parts of the living organism.

On the other hand, the morphologist has a right to ask the physiologist to bring his deductions and conclusions as far as possible into harmony with the morphological facts he has discovered. Physiology without a solid morphological basis is as sterile as a morphological fact without an attempt to determine the accompanying physiological function. So it is of quite fundamental importance to look for once at the questions of health from a histological standpoint, and the more we are able to localise distinct functions of the living body, not only in the tissues and organs in general but in the several chemical and physical properties of the constituents of the living units of the body, the clearer will be our understanding of the problems of health. Not that we are sure that we shall ultimately comprehend the significance of normal healthy life. Our intelligence is limited in power and understanding, and we shall never get to the bottom of the riddle of life and its origin and maintenance. In acknowledging this we need not be afraid to proclaim the bankruptcy of science and the fallacy and poverty of our intellect. For in this acknowledgment lies not the weakness but the power of our science. Our science ends where wisdom begins, and the scientific method, as Bergson put it in his "Évolution Créative," can never ascertain a solution of the riddle of life, of evolution, of development. Let me quote once more the opinion of the brilliant French philosopher and sage: "Is there not a wonderful division of labour, a marvellous solidarity among the parts of the organism, a perfect order in infinite complexity? It implies at once the multiplicity of elements and the interpenetration of all by all."

This exquisite harmony, this interpenetration of all by all, we see everywhere. It is true that we shall never understand it; we can only bow our heads before it in profound submission, but even when we can trace it in all the functions and in all the morphological details our science can unravel, we have gained the insight our science needs. This harmony of the organism alone can guarantee that equilibrium of the different parts of the organism which Nature is always and everywhere trying to establish or to re-establish when it is lost.

The conception of a struggle for life of the cells in the organism, worked out by Roux years ago to form the basis of his theory of functional adaptation as an analogon to the idea of a struggle for life in nature, cannot be true because it does not take this harmony of the organism sufficiently into account. Every organism is a unity in itself, and the elements which compose it are in the first place a part of the whole, deriving their full value not from themselves but from the individual to which they belong. The individual, the organism as a whole, dominates the cells which compose it. It subjugates them, so to speak, and blends them together to form that unity of the living organisms, that harmony of their organisations, which is the greatest wonder and mystery of Nature. Thus in the organism the conception of the cell as the smallest unit of living substance, as the self-sustaining component part of the multicellular colony we call the organism, is pushed a little into the background, and only where the cells as distinct units are necessary for constructive purposes are they to be recognised as distinct separate units.

The pioneers of histology—men like Robert Brown, Schleiden and Schwann, Max Schultze, Ranvier, Huxley, and Virchow—in the beginning of the nineteenth century formulated a conception of cells as the smallest units, as the indivisible self-propagating independent elementary organisms, originating in a direct line from the dividing egg-cell and remaining independent units until their death or the death of the organism which they helped to build up. This conception of the cell was part of the analytical mode of thinking of that century, with its eternal unravelling, splintering and dividing, trying always to trace the phenomena of life backwards to a few separate and independent factors, as if we could in this way get an understanding of the wonderful harmony of the living organism! That analytical turn of mind could formulate the "brick theory" and be satisfied by it, could define the organism as a mosaic and the phenomena of life of the organism as a mosaic work which would be explained as soon as all the phenomena were traced back to the functions of the composing cells. That analytical turn of mind required us to digest an almost endless mass of details of analytical research; the organism itself only playing a part so far as it was the inevitable bearer of the cells, the real elementary organisms par excellence.

In a more synthetic conception of Nature there is no room for this cell theory in its sharpest and most concise formulation. Clifford Dobell and Rohde, indeed, believe that the cell theory is a myth, destined to disappear from our science. Although this opinion must be rejected as a groundless exaggeration, on the other hand the assertion by Driesch that the cell theory is so absolutely true that we have to speak of a cell doctrine and not of a cell theory is as untenable as the theory of Morgan, who has no room for a conception of the organism as a whole but places the cell theory in the centre of his construction and ascribes to his genetic factors an independence and a constancy as absolute as those which he ascribes to the chemical molecules. The inevitable consequence of a conception of the cell theory in its most concise form is the assumption of a causa finalis, such as the entelechy of Driesch, the impulse systems of von Uexküll or the "Atomgeister" of Koch—that is to say, of an uncontrollable and indefinable factor in the phenomena of the life of the organisms which, when logically worked out, would make all our scientific research fruitless and sterile.

The Functional Units.

The first and most important factor is the function of the different parts of the organism, and from this point of view we have to deal with the functional units of the body and not with the morphological units, the cells. These two conceptions may be widely separated, but it seems to me that only from the standpoint of the functional units of the organism can the harmony of the different parts be exactly focused. It is this harmony which forms the essential basis of health, which Nature tries to re-establish when it is broken, in which all the different tissues have their proper importance and which is the cause of regenerative phenomena, of the growth and differentiation of the different parts of the organism, and which often seems to be reconcilable only with difficulty with the cell theory. Such a functional unit is constituted by a muscle-fibre with its innervating motor nerve-fibre, the nervous disc of a sensory Grandry corpuscle together with the tactile cells and capsule cells, the nerve-fibre of a Meissner corpuscle together with the tactile cells which compose the core and the nerve-fibre of a lamellated sensory corpuscle together with the elements of the core. It is in these units that the harmony of the different parts of the organism is best shown, for in them the morphological parts are absolutely in unison with each other and, when a pathological process is going on in one of the constituents, all the component parts are altered and strive together to conquer the threatening danger. So in modern histology we may distinguish systems of cellular units inside the macroscopic organs of the body, or indeed scattered throughout the different parts of the body, seemingly not connected with each other in the morphological sense of the word but really forming a functional unit, reacting together in the same way and at the same time to

* Being the first of two lectures (illustrated by lantern slides) delivered in London under the Chadwick Trust (slightly abridged).

certain chemical impulses which reach them. An instance is afforded by the so-called reticulo-endothelial system or the endocrine organs, where it is difficult to explain the harmony of the living body from the standpoint of the cellular units and the brick theory. Nevertheless, without going into such intimate detail we can see signs of the harmony of the organism as well in development as in growth and in the adult form.

Hormones.

To the old histologists, to whom the body was nothing but a colony built of cells as a house is built of bricks, every cell as a distinct unit had a distinct sphere of action, localised to the point where the cellular unit itself had its allotted place. The only exceptions were the gland cells, which secreted substances used in the chemical functions of the body as a whole, and the phagocytes in the blood and other tissues. It is only during the last 50 years that the doctrine of internal secretion, of which we can find the roots in the humoral pathology of Boerhaave, was formulated, although as early as 1852, Ecker and Berthold had shown that several organs of the body (the thyroid gland, thymus gland, and suprarenal body) secreted substances that passed into the blood and acted in different ways upon other cells of the organism—a conception proved by Berthold's experiments for some cell groups. Their theories, however, remained unknown or were considered false, and Claude Bernard is generally believed to have been the first to formulate the theory of internal secretion and to put it on a solid basis by his well-known experiments. Bayliss and Starling introduced the name of "hormones" for these substances, secreted by distinct cells, which pass into the blood and act upon other cells, often in distinct parts of the body, in a very peculiar and complicated way. Nowadays the doctrine of internal secretion and of the hormones forms the basis of the physiological conception of the functions of the organism. We may safely say that not only the cells composing the ductless glands of the old histologists (the endocrine glands of the later period) have the function of secreting hormones, but that every cell in the body is in some way connected with the functions of the entire organism and secretes substances playing a part in the chemical processes underlying these functional activities: the developmental processes, differentiation of the tissues, and senescence.

The hormones formed by the developing sexual organs themselves cause the other tissues of the body to differentiate in such a way that the secondary sexual characters appear. If we introduce these sexual hormones of the male character into the body of a developing female, the male secondary characters appear, giving rise to an intersexual organism. The hormones formed by the maturing ovary and its ripening and developing egg cells cause the tissues of the womb to grow and alter its structure, so that the egg may be caught and enclosed and the developing embryo nourished and fostered. The hormones formed by the growing mammalian embryo itself cause the lactic glands of the mother to develop, so that the young animal may be fed after birth. The extremely thin cells lining the blood-vessels form hormones that help the different tissues of the body to conquer an invasion of pathogenic microbes (antitoxins). By the cells of the liver are formed not only the bile, that plays such a prominent part in the digestion of the food, but also hormones that pass into the blood and play an important part in the chemical processes underlying the growth and functions of the tissues themselves. In the suprarenal body adrenalin is formed, a hormone which acts upon the walls of the blood-vessels and regulates the blood pressure. By the tissues of the intestinal wall (and other cells) is formed a hormone—the automatine of Haberland—which regulates the pulsations of the heart. The pituitary gland forms hormones which regulate certain developmental processes of the sexual organs and the skeletal tissues and cause contraction of the smooth muscles of the blood-vessels and uterus. The thyroid gland forms hormones promoting metamorphosis in young larvæ (e.g., of the frog and the axolotl); the thymus gland forms hormones causing gigantic growth of the larval body without inducing metamorphosis. The cells of the islets of Langerhans in the pancreas form insulin, that youngest and perhaps rather precocious child of human physiology, regulating the carbohydrate synthesis in the tissues. Circulating hormones produced by the thyroid gland, the suprarenal body and other groups of cells may influence and alter the functions of the central nervous system in such a marked way that Biedl called the thyroid gland the "intellect gland" (Intelligenzdrüse) and the suprarenal gland the "emotional gland" (Emotionsdrüse). Indeed, several scientists maintain that our character, our mentality, and the way we behave depend a great deal on the functions of our different endocrine glands. In short, we may safely say that every cell in the human body influences the other parts of that body in a certain way. On this internal secretion of the cellular units depends the harmonious function of the organism as a whole; it is on this that health is based. For we must never forget that the different chemical processes which form what we may call the phenomena of life, of growth, and of reaction are only able to keep the body in a healthy condition when they are regulated, harmonised, checked or accelerated by the vital action of the different parts of the body itself. Only in this way, by what Bergson called "the interpenetration of all by all," is reached the perfect harmony which we may call "health" and which gives us that "perfect order in infinite complexity" which enables us to use all our energy, to play our part in the world, to "fill the unforgiving minute with sixty seconds' worth of distance run."

The Study of Vital Processes by Staining.

This vital action of the cells depends largely on the chemical processes going on in the living protoplasm. The old histological methods enabled us to see something of the chemical aspect of the reactions of living matter only in a few exceptional cases. But modern histology has given us some very important and interesting methods of studying these chemical processes. Living protoplasm generally cannot be stained by those dyes which are imbibed by dead protoplasm and its differentiation products, and so to study the reactions of living matter we were obliged to kill it first, often by very crude chemical reagents. This is as if, in order to study the organisation of a watch, we began by beating it with a hammer until it lost all resemblance to a watch, and then investigated the broken and crushed pieces of steel, copper, and glass. Now, however, we can use the so-called vital stains: certain staining fluids can be injected into the veins of a living animal without causing death and are then excreted again or taken up by distinct types of cells in the body. When we kill the animal and study sections through the different tissues, we are able to distinguish a number of cells, which have taken up the stain, from the surrounding elements which have not, and can conclude that these cells have chemical properties and other functions different from those of the surrounding elements, from which they could not be distinguished by ordinary histological methods. There must exist in these cells a distinct kind of protoplasm with distinct physiological properties, for not only are the special vital stains (lithion-carmine, pyrrhol blue, indigo-carmine, and colloidal solutions of gold) taken up and stored in these cells in a special granular form, but other chemical solutions (e.g., iron salts and bismuth) are taken up as well, and may be precipitated afterwards in the sections and so located chemically with great accuracy.

Experiments of this kind led Goldmann, and afterwards Aschoff and Landau (in 1913), to formulate the view that there exists in the different parts of the body a widely spread system of cells, formerly distinguished as connective tissue cells, macrophages, clasmatocytes, histiocytes, &c., by the older histologists. This system Aschoff and Landau called the "reticulo-endothelial system," because its elements are, in their opinion, partly the endothelial lining of the blood-vessels, the lymphatic system, and the spleen. To it they attributed a special chemical activity, the formation of hormones, antitoxins, and antigens—of substances, in short, of the highest importance for the reactions of the organism in infection, disease, and health. In this system are incorporated not only a number of connective tissue cells scattered throughout the body, but also cells circulating in the blood and passing from the blood to the tissues and vice versa, and also the so-called intermediate cells of the sexual organs, which were said to play such an important part in the creation of physiological sexual hormones.

To review here the very extensive literature on the reticulo-endothelial system would lead us too far into details. The original views of Aschoff and Landau have not always been confirmed and corroborated by the more recent writers and have been criticised very severely, especially in connexion with the endothelial lining of the blood-vessels, which according to many scientists have nothing to do with the system,[1] but the main facts remain unchallenged. I have mentioned the problem here to show how the modern histologist is able to tackle the problem of the histological basis of health and of the physiological properties of the cellular units from quite another side than the old methods allowed, and to point out that these new lines of research enable us to discover new functions of the tissue elements and unsuspected and undreamed-of ways of harmonious coöperation between widely separated cells in the body.

These new researches have shown us not only an harmonious coöperation but a constant interchange of functions to secure the normal state of the organism. Tissue cultures—the culture of living cells and pieces of tissue outside the body in drops of nourishing fluid under a cover-

[1] Many scientists therefore prefer for this system the old name of "histiocytes."

glass—have shown in recent times not only that cells from the connective tissue may turn into blood corpuscles or migrating cells, but that real blood corpuscles, circulating in the blood, may migrate into the connective tissue and become connective tissue cells, real fibroblasts, builders of the connective tissue, and even fat cells, that help to build up the tissues of the body and to store up its energy. To my mind there is nothing so illustrative of the harmony of the body and the dominance of the organism as a whole over the cellular units as this interchange of functions this "interpenetration of all by all," which occurs wherever it is needed to maintain and secure the normal healthy state of all its parts. It is always the connective tissue—penetrating the whole body, carrying the nourishing blood-vessels, the lymphatics and the nerves, securing and guiding the chemical processes of the different organs, forming the supporting tissues (bone, cartilage, sinews, and ligaments)—which plays such a prominent part in this harmony of the organism and tries to secure it by constant efforts to adapt to the ever-changing environment.

The Problems of Senescence.

The problem of senescence is closely allied to the problem of growth. Why do we get old? Why has every animal a definite duration of life, varying little in a given species but extraordinarily different in different forms? Why is man among mammals distinguished by his extraordinary longevity, but why, after all, do we die? Of death we know nothing. We see it everywhere around is, but we do not know what it is, any more than we know what life is. Let us simply define death as the irretrievable loss of life and the definite change of the body into a corpse. Then we may say that for every living organism, for every plant and every animal, the price of life is death at the end. Of course we speak here only of natural death. When a body is crushed, burnt, or drowned, we are quite easily convinced that death follows, but even when we can exclude violent accidental death we see at the close of life that the energies become less and less, old age sets in, the movements become less frequent and less energetic, atrophy begins, and death is the end. "Natural death"—viz., the termination of existence due to uniform senescent atrophy of all the structures of the organism, leading to a uniform depression and ultimately to a simultaneous extinction of all the functions, is probably very rare. In actuality death is always in some measure accidental. An aged individual contracts pneumonia and succumbs to its effects, or a cerebral vessel is ruptured, or some other misfortune occurs as the result of a chance encounter. The same encounter, however, may have occurred repeatedly in the life of the individual without his ever having been conscious even of indisposition. Why has the final encounter a different issue? Simply because the underlying senescence of his tissues has rendered them more vulnerable. So, after all, death is the end of this general senescence of the tissues, and the real question we have to answer is why do we get old, and what is senescence?

Senescence is in the first place a general change of the body, not of a single tissue. The very old grow shorter in stature. At the age of 40 this diminution in height is already beginning, at 70 the average height has shrunk from 175 cm. to 160 cm. This decrease in stature is largely due to changes in the vertebral column, to stoop and to changes in the tissues. The roundness of youth has departed, the cheeks are sunken, the eyes have fallen far back, and the lips are drawn in. There is an atrophy of the tissues, especially of the connective tissues. The gait becomes shuffling, the old man drags himself cumbrously along; the power of his muscles and his control over the action of these muscles is lessened; there is an inferior coördination of his movements. The same phenomenon of atrophy shows itself in the digestive organs; the minute structures in the wall of the stomach by which the digestive juice is produced undergo a partial atrophy. The lungs are stiffened; the heart is enlarged, but acts more feebly than in the young; the walls of the arteries lose their elastic qualities; the germ-cells cease their activity altogether; the weight of the brain becomes less; the respiration is depressed; the body-warmth is diminished; in short, there is an atrophy in all the organs. So Metchnikoff, for example, sees the nature of senility in the single word: "atrophy." "On résume la sénilité par un seul mot: atrophie." Other scientists see the chief cause of senescence in the changes of the vascular system. According to Osler longevity is a vascular question; this view has been well expressed in the axiom that a man is only as old as his arteries. Others lay much stress upon the disharmonies, the imperfect adaptations of the tissues within us to the performances of the body as a whole. According to Mühlmann the fundamental nature of senility lies in that diminution of the surface in proportion to the bulk of the body which is characteristic of the old. He concludes that we become old chiefly because we do not have proportionately enough surface left. Further, he regards "physiological death" as attributable to the breakdown of the nervous tissues, especially in the brain. Lorand attributes physiological death to the failure of one or more of the organs of internal secretion. Savill refers it, as Osler did, to the progressive loss of elasticity of the arteries, with or without renal complication. In short, every part of the circle has been made to appear the origin of the whole.

Two scientists of the Institut Pasteur made, in 1912, a minute study of the tissues of a woman of 93 who had died in consequence of an acute illness of only 36 hours' duration. An unusual opportunity was here presented of ascertaining the condition of the organs of a very aged person without confusion by the special injuries due to a protracted illness. They found a great number of abnormalities, including widespread sclerosis, leucocytic infiltrations, hypoplasia of the glandular tissues and calcification of the blood-vessels, and the choroid plexuses in the brain and spinal cord. The suprarenal glands were hypertrophied. Any one of these abnormalities might have led, either directly or indirectly, to death. While death might have been attributed to the particular lesion immediately responsible, yet this would in fact have only determined the mode of death, and mortality was, as Robertson put it, actually ordained by the underlying senescence to which all of the lesions were ultimately attributable. So senescence is of a general nature; as Child formulated it, senescence is merely one aspect of development, and one alteration is the cause of another or of many others.

Those alterations may be purely chemical. For instance, the physiological value of nearly all the connective tissues is due to their colloidal nature. According to the interesting investigations of Heringa and Lohr, the collagenous fibrillæ are nothing but a gelification, an arrangement of polarised ultramicrones in a row, and connective tissue is a thread-forming gel. This colloidal structure may be altered by chemical changes in the surrounding fluids: the elastic fibres will lose a great deal of their elasticity when they are overcharged with calcium salts. A change in the lymph fluid may cause a considerable loss of the solidity and strength of the collagenous fibres. In old age the connective tissue loses its elasticity and strength; it becomes dried up and the amount of water is markedly lessened. The colloidal substance of the elastic fibres, the elastin is also changed by old age. It changes into elacin, which is far less elastic than the elastin of the young tissues. This elacin has a greater affinity for fixating the calcium salts and the iron salts and its elasticity is thereby still more modified. Thus the changes in the connective tissue elements are mostly of a colloidal chemical nature and irreversible.

If the symptoms of age are chemical and irreversible, is there no delaying of old age, no rejuvenescence? Of recent years much has been written about the "rejuvenescence" which follows the hypertrophy of the interstitial cells of the testes, consequent upon suppression of the gametogenic function by ligation of the spermatic ducts or the implantation of sexual glands from other and younger animals. The data presented by Steinach, however, or even those of Voronoff, indicate in animals so treated no evidence whatever of rejuvenescence in the sense of the delay or overcoming of senescence. The effect appears rather to be stimulative, possibly an acceleration of metabolism consequent upon the synchronous stimulation of several endocrine organs. It may very well be questioned whether such stimulation, the extent and force of which is not to be measured or regulated, in a senescent and exhausted organism may not rather be a disadvantage and even a danger. The evidence upon which Steinach appears chiefly to depend is a reawakening of the sexual instinct, a form of "rejuvenation" which is far from desirable in the aged. As might be expected, the outcome of the operation in some instances has been disastrous. Voronoff, on the other hand, assures us that in many cases he has obtained a marked and indisputable degree of real rejuvenescence by transplanting into aged animals sexual glands or one of the other endocrine glands. In the case of aged human beings, however, even his results seem to me to be still very doubtful.

According to Child, senescence is merely one aspect of growth. This is fully in accordance with the view of Minot, who years ago showed that senescence is not a feature of old age but shows itself, so to speak, already in early youth. Old age is simply the period of retardation of growth, of very slow decline, whilst senescence is at its maximum in the very young and its rate diminishes with age. Senescence depends on the differentiation of the cells, and natural death is the consequence of cellular differentiation. So we have to look at the problem of growth to understand the problems of senescence and old age.

The Problem of Growth.

The problem of growth may also be looked at from the chemical point of view. In the first place the rate of growth

is not always the same, and periods of very slow growth are followed by periods of very marked acceleration. Thus the rate of growth during the first part of the period of gestation is very slow, but it is succeeded by an extraordinarily rapid accretion of tissue during the months immediately before and after deliver. Towards the end of the first year of extra-uterine life a definite slackening of growth occurs and this is succeeded by the relatively rapid growth of the third, fourth, and fifth years of life. Another pause or slackening ensues, to be followed by the energetic growth which accompanies adolescence (Robertson). Similar phenomena are exhibited in the growth of every animal. They led Minot to his thesis that the slackening of growth after the first peak of the growth curve is the beginning of the process of senescence.

It was pointed out years ago by Robertson that this phenomenon—a process which takes place at first slowly, later with greatly accelerated velocity and later still as slowly as it began—is seen in a number of chemical processes in which organic substances play a rôle; where the processes are what is called "autocatalysed" or self-accelerated. The fact that the reaction has occurred is, up to a certain point, a favourable condition for its further occurrence. Seen as a chemical process, the process of growth is autocatalysed; it develops accelerative agents as it proceeds. Robertson was therefore able to show that the process of growth, its acceleration and retardation, assimilation and decomposition, may be represented by the same curve and its course expressed by the same mathematical formula as an autocatalysed chemical process. In fact, it may be analysed as a distinct chemical reaction or a series of chemical reactions dependent on the velocity of the slowest reaction, which Robertson calls the "master-reaction." Not that the reactions of growth are simple reactions; the process of protoplasmic synthesis is exceedingly complex, involving multitudinous parallel, successive and independent reactions. Nevertheless, as Robertson pointed out, we may conclude that, in the chain of processes which culminate in the production of living matter, there is one reaction which is slower than the rest, so that the whole concatenated series of events waits upon this reaction, which may be called the "master reaction." So we could bring down the problem of growth, and of its velocity and acceleration, to the study of the "master reaction," which is probably of a very complex, multi-molecular type, and thus look at it from a chemical point of view, as Chodat did when he showed that in plants cellular multiplication, which of course underlies the process of growth, is autocatalysed. According to Chodat the catalyser is the living cell itself, but in animals the processes of growth and cellular multiplication are far too complex to be explained so simply, and we have to look for other processes by which the growth curve may be influenced. When we try to look at the problem of growth from this chemical point of view, to study the master reactions, and to look for retarding and accelerating influences, we see that a vast field of interesting research lies barren, and that in this way we may get a better insight into the process of growth and thence into the histological basis of health than from any other point of view.

To give a curious example, we see, as Gurwitsch has shown, that multiplying cells send out peculiar rays of a very short wave-length by which other cells are induced to divide and to multiply themselves, so that the process of cell-division is catalysed. We see that the accessory food factors of Gowland Hopkins, the vitamins of Eykman, have a distinct influence on the rate of growth. For example, the fat-soluble accessory contained in butter is essential for the growth and reproduction of animals (Hume, Masing). Adult rats are able to withstand its absence from their diet for over a year without loss of weight, but if previously, in the growth period, they have been confined to a diet deficient but not altogether lacking in it, then subsequently when they are nearly adult deprivation causes, after some delay, a sudden decline of weight and ultimate death from apparent inanition or from intercurrent disease. When young animals which have hitherto received normal nourishment are suddenly deprived of this factor, they continue to grow for a considerable period, but growth cannot be sustained and the arrest of growth is followed by progressive loss of weight (Robertson). The water-soluble accessory factor, the original vitamin studied by Eykman, which is present in leguminous seeds and in the germ of cereals (from which it was secured in crystalline form by Jansen), has the same properties. It is essential for the growth of young animals and children, and indeed the effect of its deficiency in the diet is much more rapidly evident than the effects of deprivation of the fat-soluble accessory. But not only is growth suspended; other abnormalities too are displayed when it is absent—e.g., cessation of the growth and multiplication of the germ-cells, atrophy of the lymphoid tissues and of the thymus gland, and diminution of the number of lymphocytes in the blood. We may safely say that all the known vitamins play an important part in the acceleration and retardation of growth, in the formation of hormones, in short as catalysers in the chemical processes of the body. In the same way we may attribute to the formation of autocatalytic substances the stimulating effect of certain hormones upon the growth of certain tissues—viz., those which give rise to the secondary sexual characters.

It is of great interest to study the effect of nutrition upon growth from the chemical standpoint. That good food is necessary nobody will ever deny, but we must not overrate the influence of food upon the essential factors of growth. Many animals are known to take no food during metamorphosis; they therefore feed on their own tissues, and get smaller during development. Even in starvation the nutrient level is never at zero, and cells possessed of a very low nuclear ratio—i.e., not differentiated—may actually multiply at the expense of the other tissues of the organism, as when a wound heals or regeneration occurs in a starving animal. Even in starvation Nature strives by all possible means to maintain the dynamic equilibrium of the body. The cells become smaller, but the relation between the nucleus and the cytoplasm, the nuclear ratio so important for the metabolic processes inside the cell-body, remains the same as long as possible. When it is altered it becomes as in periods of intense growth, so that we can speak of a rejuvenescence of the organism analogous to the condition in the embryo, where the cell-body is likewise small in relation to its nucleus. Thus we can understand the interesting fact, first demonstrated by Morgulis, that there is in different animals a great acceleration of growth-rate after a period of inanition. If, as Morgulis pointed out, at a certain period of growth in salamanders the proportion of food converted into protoplasm was 26 per cent., after starvation and readmission of food it rose as high as 73 per cent. Kahan, a Russian investigator, found (I quote again from Robertson) that rabbits after 17 days of inanition, when they had suffered a loss of 31 per cent. of their body-weight, gained 56 per cent. in weight on a diet even less sufficient than that which could maintain them in a state of equilibrium under normal conditions. In other words, a diet which before barely permitted maintenance becomes, after a period of starvation and even at the same body-weight, a diet which permits growth. Retarded individuals in any random group of children generally exhibit a late acceleration of growth; in this connexion we can point to the compensatory overgrowth which succeeds the postnatal loss of weight in infants. Furthermore, those organs which are most essential to the preservation of existence are those which suffer least extensively from the deprivation of food, as, for instance, the heart and the central nervous system. Their autocatalyst level rises at the expense of the less important organs and cells. Thus the problem of growth and nutrition brings us to the problem of the differentiation of the tissues and the cellular units.

The discussion of the histological basis of health has therefore brought us gradually down from the general principles by which our organism is governed—harmonious development, and the harmony in the functions of the adult and its alterations by senescence—to the details of nutrition and to the differentiation of the cells and tissues.

STANDARD RATINGS FOR X RAY APPARATUS.

WE have received from Messrs. Watson and Sons (Electro Medical), Ltd., a catalogue entitled "High Tension Transformers." It is a booklet of 47 pages, a third of which is devoted to the simple physics of modern X ray apparatus, the remainder describing the large variety of X ray sets made by this well-known firm. The principle and construction of X ray transformers are briefly described, and the rectification of the current from high tension transformers, more especially by valve tubes, is also dealt with. The importance of the testing of transformers is emphasised, and it is with pleasure that we notice that this firm has adopted the standard ratings for X ray transformers proposed by the British Electrical Standards Association to which we referred recently (Dec. 28th, 1929, p. 1374). The current from a transformer is alternating in character and an effective value which takes an account of this fact is adopted in the standard specification. The current from an X ray set complete with rectifier is, however, unidirectional. For sets of this kind Messrs. Watson and Sons have adopted ratings similar to those proposed for X ray transformers except that the effective value of the alternating current of the latter is replaced by the reading afforded by the milliammeter when the set is working under the specified conditions. The catalogue is replete with diagrams and excellent photographs of X ray apparatus.

EARS OF CORN EXTRUDED THROUGH THE CHEST WALL.

THE LONG ARM OF COINCIDENCE.

To the Editor of THE LANCET.

SIR,—In your issue of Jan. 11th appeared the story of a child of 3½ years in Staffordshire who had sniffed into his lungs a one and a half inch long grass seed, and after considerable travail had delivered this through an abscess in the right scapular region. In the *British Medical Journal* of the same date appeared a report of a similar case in which a child of 9 months in Hertfordshire had inhaled a one and a half inch grass seed and had got rid of this through its right scapular region. How few of your readers will have seen or heard of such a case, and how unlikely that two such cases should have been under treatment in September last year, and should have been brought to the notice of the medical profession in the same week!

I am, Sir, yours faithfully,

PERTINAX.

Mr. Vincent Patrick, who (with Dr. E. H. Coleman) described the case in our own columns, sends us a letter he has since received, making the third which has come to his knowledge. This letter runs:

Dear Sir,—I have taken the liberty to write to you about the boy that swallowed the grass ear, as my son, aged 17, swallowed one 16 months ago. He was very ill, but as he did not tell us he had swallowed the ear, a doctor treated him for rheumatic trouble. After he had been in bed a few days he had a swelling at the bottom of his left lung, and of course I put hot fomentations on, as I thought it was an abscess. While I went downstairs to get some water to wash him, he got out of bed and, looking over his shoulder in the looking glass, saw the swelling, which he pressed, and the grass burst out right to the other side of the room. The smell of the stuff that came away was terrible. I had to put a handkerchief over my nose.. He now has a nasty hacking cough sometimes at night. I have got the grass in a bottle, but it has broken in two. The grass ear must have passed right through his left lung.

I remain, yours respectfully,

Mrs. X——.

An ear of rye grass was shown to the Clinical Society of London nearly fifty years ago (THE LANCET, 1882, i., 350) by the late Sir Rickman Godlee. This ear had been "swallowed" by a child two years old, and 43 days later made its exit through the back between the sixth and seventh ribs, three inches from the spine on the left side. He thought the grass had probably entered the œsophagus and not the trachea, the cough being due to some accompanying pleurisy. At the same meeting Mr. R. W. Parker related the case of a child in whom a swallowed piece of grass emerged through an abscess in the left side, the contents of which had a distinct fæcal odour; and Mr. Golding Bird mentioned an ear of rye grass covered with pus which had been brought to him by a friend with the story that it had been swallowed by a girl, eight years of age, who suffered for a year from illness believed to be phthisis, but who recovered after the ear of grass had presented in an abscess under the left breast.

THE BRITISH RACE IN MEDICINE.

A LECTURE delivered recently by Dr. R. O. Moon, under the auspices of the People's League of Health, proved of interest to the audience because the lecturer, while narrating historical facts concerning many great names, was able to point to the characteristics which were displayed by the various discoverers connected with British medicine. The great Sydenham emerges as a very British type. Of learning, as such, he seems to have had a deep distrust, but on the necessity for close personal observation, and for collating the phenomena of disease with those of natural history, he was emphatic. He classified great diseases and made sound pathological deductions, but seems to have entirely overlooked Harvey, who had published the *De Motû Cordis* when Sydenham was only four years old.

DETECTION OF POISONS BY THE SPECTROSCOPE.

THE delicacy of the spectroscope as a method of revealing traces of elements far too small to detect by any of the usual chemical tests is well known, so little as 10^{-9} gramme of sodium being revealed by this means. Emission spectra have come to be recognised as the most reliable criteria for the identification of elements where only small quantities of material are available. The use of absorption spectra for the detection of alkaloids in solution was described so long ago as 1903 by Dobbie, but this aspect of the subject has only comparatively recently received attention from toxicologists. The significance of absorption spectra has lately been much in evidence in connexion with work on vitamins. The publication of a 17-page pamphlet entitled "The Detection and Investigation of Poisons by Spectroscopy," by the firm of Adam Hilger, is therefore timely. The subject matter is divided into three sections entitled Applications, Equipment, and Methods of Working. Under the first heading are given specific examples of the employment of the method with reference to original papers. The section on Equipment gives particulars as to cost of outfit, while a brief description of working details is given in the last section. A perusal of the pamphlet will impress the reader with the great potentialities of the spectroscopic method of examination when placed in the hands of competent workers.

TREATMENT OF CANCER AT THE BRISTOL ROYAL INFIRMARY.

To the Editor of THE LANCET.

SIR,—In view of the unauthorised and misleading statements which have appeared in certain sections of the lay press the Faculty of the Bristol Royal Infirmary would be glad if you would allow them to state very briefly the true position with regard to the treatment of cancer here. A considerable amount of research has been carried out, both clinically and in the laboratory, and special beds have been set aside for the study of cancer. A number of patients have been relieved, in some cases to a very gratifying extent, by lead compounds and other methods of treatment, but some unfortunately show no improvement, and no claim to have achieved a cure has ever been made. Details have appeared, on more than one occasion, in medical publications.

I am, Sir, yours faithfully,

R. C. CLARKE,
Hon. Secretary to the Medical Faculty,
Jan. 15th, 1930. Bristol Royal Infirmary.

A PERMANENT HOME FOR CHRONIC INVALIDS.

THE search for an inexpensive permanent home suitable for chronic invalids, especially those helplessly crippled by rheumatism or totally incapacitated by poliomyelitis or disseminated sclerosis, is often fruitless. Our attention has been called to one recently established by two registered nurses at The Oaks, Malden-road, New Malden, Surrey (Malden 1264). The home is five to eight minutes' walk from Malden Station, whence trains leave for Waterloo every five minutes. At present accommodation is available for nine patients, divided into one room with three beds, two rooms with two beds and two single rooms. There is a common room for the use of patients who are not bedridden and an attractive garden. Patients can choose their own medical attendants, arrangements being made for those who come from a distance. The fees are from 2½ to 6 guineas weekly, excluding medical fees and personal laundry. Patients' friends are admitted at any time during the day, and can be accommodated for short periods.

SEROLOGICAL DIAGNOSIS OF MALIGNANT DISEASE.

THE Lega Italiana per la lotta contro il cancro offers a prize of 15,000 lire for an original paper, written from a critical and experimental standpoint, on the Value of Serological Methods in the Diagnosis of Malignant Tumours. The paper will be judged by a committee of three, appointed by the President of the League. The papers must be typewritten, anonymous, and sent in duplicate to the headquarters of the League (Rome (33) Via Triboniano, presso Piazza Cavour, Casa dol Mutilato) in a closed envelope, bearing a motto on the outside. The same motto must be written on another closed envelope containing particulars of the author's name, address, &c. Papers must reach the above address not later than June 30th, at midday. The League reserves the right to publish the winning paper, for the first time, and in Italian, in its Bulletin.

COLONIES FOR MENTAL DEFECTIVES.—The Board of Control, with the approval of the Minister of Health, have appointed a committee to consider and report what are the essential structural requirements of a complete colony for mental defectives of all types and to what extent the cost could be reduced by the adoption of semi-permanent or temporary buildings or other new methods of construction, having regard to the comparative cost of maintenance as well as the initial capital expenditure involved. The Committee is constituted as follows:—Mr. Walter Hedley, K.C., Recorder of Newcastle-on-Tyne (Chairman); Mrs. F. Rose Davies, J.P., Alderman, Glamorgan County Council; Miss Clara Martineau, J.P., Member of the Birmingham City Council; Sir George Oatley, F.R.I.B.A.; Dr. A. Rotherham, Commissioner of the Board of Control; Mr. A. Scott, A.R.I.B.A., Chief Technical Officer, Ministry of Health; Sir Lindsey Smith, J.P., Chairman of the Board of Governors of Holloway Sanatorium; and Dr. F. Douglas Turner, Medical Superintendent of the Royal Eastern Counties Institution, Colchester; with Mr. H. J. Clarke, of the Board of Control, as Secretary.